

UNCLASSIFIED

AD 4 2 6 1 4 3

DEFENSE DOCUMENTATION CENTER

FOR

SCIENTIFIC AND TECHNICAL INFORMATION

CAMERON STATION, ALEXANDRIA, VIRGINIA



UNCLASSIFIED

NOTICE: When government or other drawings, specifications or other data are used for any purpose other than in connection with a definitely related government procurement operation, the U. S. Government thereby incurs no responsibility, nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use or sell any patented invention that may in any way be related thereto.

CATALOGED BY DDC 426143

Research Report

AS AD No. _____

PREDICTING SUCCESS IN AVIATION TRAINING

Richard W. Shoenberger, Robert J. Wherry, Jr., and James R. Berkshire

Bureau of Medicine and Surgery
Project MR005.13-3003
Subtask 10 Report No. 7

Approved by

Captain Ashton Graybiel, MC, USN
Director of Research

Released by

Captain Clifford P. Phoebus, MC, USN
Commanding Officer

24 September 1963

U. S. NAVAL SCHOOL OF AVIATION MEDICINE
U. S. NAVAL AVIATION MEDICAL CENTER
PENSACOLA, FLORIDA

SUMMARY PAGE

THE PROBLEM

One in every three men who begins naval aviation training fails to complete it. The average length of time in training for men who quit or are dropped has been about thirty-six weeks. If individuals with low probabilities of success could be identified and dropped earlier in training, substantial improvements in the utilization of training personnel and facilities could result.

FINDINGS

This report describes the development and application of computerized multiple correlation techniques to the prediction of student success or failure in naval aviation training. It presents the succession of matrices, the multiple correlations, the regression formulae, and the methods of applying these to the prediction of the probable success of individual students.

Shoenberger, R.W.

R.J. Wherry, Jr., J.R. Berkshire

1963

PREDICTING SUCCESS IN AVIATION TRAINING. BuMed Project MR005.13-3003 Subtask 10, Report No. 7. Pensacola, Fla.: Naval School of Aviation Medicine, 24 September.

Described in this report are the development and application of computerized multiple correlation and regression techniques for the prediction of student success or failure in naval aviation training. Included are the correlation matrices, multiple correlations, regression formulae, and the methods of applying these to the prediction of student success which were developed as a result of this research.

Aviation personnel-
Training

Psychology

Psychometrics

Shoenberger, R.W.

R.J. Wherry, Jr., J.R. Berkshire

1963

PREDICTING SUCCESS IN AVIATION TRAINING. BuMed Project MR005.13-3003 Subtask 10, Report No. 7. Pensacola, Fla.: Naval School of Aviation Medicine, 24 September.

Described in this report are the development and application of computerized multiple correlation and regression techniques for the prediction of student success or failure in naval aviation training. Included are the correlation matrices, multiple correlations, regression formulae, and the methods of applying these to the prediction of student success which were developed as a result of this research.

Aviation personnel-
Training

Psychology

Psychometrics

Shoenberger, R.W.

R.J. Wherry, Jr., J.R. Berkshire

1963

PREDICTING SUCCESS IN AVIATION TRAINING. BuMed Project MR005.13-3003 Subtask 10, Report No. 7. Pensacola, Fla.: Naval School of Aviation Medicine, 24 September.

Described in this report are the development and application of computerized multiple correlation and regression techniques for the prediction of student success or failure in naval aviation training. Included are the correlation matrices, multiple correlations, regression formulae, and the methods of applying these to the prediction of student success which were developed as a result of this research.

Aviation personnel-
Training

Psychology

Psychometrics

Shoenberger, R.W.

R.J. Wherry, Jr., J.R. Berkshire

1963

PREDICTING SUCCESS IN AVIATION TRAINING. BuMed Project MR005.13-3003 Subtask 10, Report No. 7. Pensacola, Fla.: Naval School of Aviation Medicine, 24 September.

Described in this report are the development and application of computerized multiple correlation and regression techniques for the prediction of student success or failure in naval aviation training. Included are the correlation matrices, multiple correlations, regression formulae, and the methods of applying these to the prediction of student success which were developed as a result of this research.

Aviation personnel-
Training

Psychology

Psychometrics

INTRODUCTION

In aviation training, as in any training or educational program, whenever a student is having difficulties a decision must be made whether to drop or restore him to the program for another chance. In naval aviation training this decision is made by an administrative officer, or by a board of officers. An attempt is made to integrate the information available on the past performance of the individual--his aptitude test scores, his grades and ratings, his interests, his judged motivation, et cetera--into an accurate judgment of the student's probability of success if he is returned to the program. In naval aviation training quantitative information about the students accumulates rapidly; by the end of pre-flight school (the first 16 weeks) over thirty grades and scores are available on each student. The administrators who must make decisions about marginal students are soon embarrassed by the availability of more performance data than they can assimilate and integrate into a decision. In the past the problem has often been met by ignoring much of the information and basing judgment on two or three measures with which the administrators had the most familiarity or in which they had the most confidence.

It seemed reasonable, however, that, if all of a student's valid past performance measures could be appropriately weighted and combined into a single statement of the probability of his success or failure, the decisions of the administrators concerning students might become more accurate. Knowledge of such probabilities should lead to the earlier dropping of men with high probabilities of later failure and the retention of men who have good chances to complete the program. This, in turn, should result in marked improvement in the efficiency with which the training facilities are used. These ideas and goals are not new; however, the development and pursuance of them became practical only after the acquisition of a high speed digital computer, approximately two years ago.

INITIAL PROCEDURE

The selection and training records of 820 non-officers and 766 officers who entered naval aviation training during calendar 1959 were used as the basic data. With the selection measures as the beginning a succession of inter-correlation matrices was computed. In conjunction with each inter-correlation matrix, the biserial correlations with pass/fail and pass/dropped at own request (DOR) dichotomies were computed for each variable. (Failure cases included flight failures, academic failures, and men dropped for disciplinary reasons.) At each point in training at which one or more additional variables became available a new matrix incorporating these variables was computed. Since the pre-flight training of non-officers and officers differs, separate sequences of matrices were computed. For each matrix the multiple correlations and the appropriate beta weights of the variables with the pass/fail and the pass/DOR criteria were computed separately using the Wherry-Doolittle method.

The matrices, multiple correlations, and beta weights are shown in Appendix A for the non-officers and in Appendix B for the officers.

Comparison between the multiple correlations with pass/fail and those with pass/DOR will show that both criteria were somewhat predictable, but by different formulae. However, administrators are normally required to make decisions only about men who are failing, never about men who are quitting; therefore, the formulae from the pass/fail multiples were the ones used in predicting student success.

Subsequent to the collection and analysis of these data the Naval Air Training Command changed some of the physical training tests. Thus, for certain variables, scores comparable to those used in this research were no longer available, so that these variables had to be dropped from the prediction formulae. In addition, certain simplifications were made. First, wherever two or three successive formulae were identical in variables and similar in weights, only one was used. Second, whenever the last several variables in a multiple added only three or four thousandths to the magnitude of the validity coefficient, these were dropped from the formula. In Appendices A and B, under the heading "Shrunken Multiple R with Pass/Fail," the variables that actually were used in predicting student success are marked with asterisks.

Table I shows the periods in training during which particular prediction formulae shown in Appendices A and B were used.

Table I
Training Periods During Which Particular Prediction Formulae Were Used

NON-OFFICERS			OFFICERS		
Period Used	# Variables	R	Period Used	# Variables	R
Weeks 1 and 2	5	.38	Weeks 1 and 2	4	.26
Weeks 3, 4 and 5	6	.42	Weeks 3, 4 and 5	5	.35
Weeks 6, 7 and 8	7	.45	Week 6, and Pre-solo prior to hop #9	8	.43
Weeks 9 and 10	9	.49	Pre-solo hop #9 and after and Precision	9	.53
Weeks 11, 12 and 13	8	.54	Transition	7	.56
Weeks 14, 15, 16 and Pre-solo prior to hop #9	9	.56	After Transition	7	.63
Pre-solo hop #9 and after and Precision	8	.64			
Transition	7	.55			
After Transition	6	.56			

INITIAL APPLICATION

In order to transform these multiple validities into probability estimates that could be used to increase the accuracy of decisions about individual students the following steps were taken.

1. For each student who had entered training during 1959 a regression score was computed for each of the stages of training shown in Table I. Thus, at the first stage (1st and 2nd weeks), the regression scores of 1078 non-officers and 797 officers were computed by multiplying each student's scores by the appropriate weights and summing the products. This was repeated for each later stage for those students still in the program.

2. At each stage the frequency distribution of the regression scores of men who subsequently graduated from training was compared with the frequency distribution of the scores of those men who subsequently failed to complete training. By dividing these distributions into five or six segments, and by determining the numbers of completing and noncompleting students within each segment, it was possible to establish empirical probabilities of success for each regression score.

3. The results were put into tables of variables, beta weights, regression scores, and probabilities of success for use at each level of training (see Table II).

Formal instructions for obtaining a statement of the probability of success of individual students at any point in training were issued to the administrative personnel. These statements gave the odds for or against the student's subsequent completion of training and were obtainable by calling in the student's name, pre-flight class number, and certain recent grades to a "Student Prediction Center." Statistical clerks in the center computed the regression score for the particular stage of training and compared it with the appropriate Regression-Probability Table (as in Table II). It was usually possible to complete this operation in ten to fifteen minutes per student.

Administrators were cautioned that these probability statements were based upon all of the significant scores, grades, and ratings in the student's record, weighted in accordance with their relative importance to success, and that they were not to give additional consideration to any of the individual measures in the record. On the other hand, they were told that each case was to be decided on its unique merits, recognizing that many important aspects of a case or of a man might not be reflected in this probability statement.

Table II

Table for Determining Probability of Graduation--14th, 15th, and 16th Weeks
(Non-Officer Students)

Variables	Mean	S.D.	Weight
Spatial Apperception	20.60	5.48	.27
Biographical Inventory	33.20	8.20	.10
Education	6.74	1.22	.41
Peer Rating	50.30	10.86	.20
Navigation	48.92	6.80	.34
Trampoline	30.15	5.98	.17
Jump Reach (I)	11.03	2.77	.20
Engineering	49.97	8.25	.24
Physics	48.13	9.63	-.10

Regression-Probability Table

Score	Per Cent	Will Complete	Won't Complete
60.0 or more	9	7	1
53.0 - 59.9	43	3	1
49.0 - 52.9	28	1 1/2	1
45.0 - 48.9	14	1	1 1/4
44.9 or less	6	1	4 1/2

N = 967 R = .56

No completions below 40.9 - ten failures.

REVISED PROCEDURE AND CROSS VALIDATION

In the initial procedure the criterion was that of pass/fail (flight, academic, or disciplinary), and the beta weights used were those that maximized the correlations with pass/fail dichotomies. Further study of the problem, however, indicated that slightly more useful (and more stable) predictions could be obtained by using as the criterion a complete /incomplete dichotomy, despite the fact that putting all types of attritions together lowered substantially the magnitudes of the obtained multiple correlation coefficients. Therefore, after eliminating those variables which had not been found useful in the original prediction formulae, the matrices were re-run on the 1959 students including all of the attrition cases. The Wherry-Doolittle method was used to re-determine the multiple correlations and the beta weights appropriate to prediction at each stage.

Appendices C and D show the new matrices and the shrunken multiple \bar{R} 's with the complete/attrite criterion. (Subsequent to the computation of the matrices shown in Appendices A and B the computer program was changed to yield point-biserial rather than biserial \bar{R} 's. The equivalent bi-serial \bar{R} 's are also given in order to permit comparison with the multiple correlations obtained earlier with the pass/fail criterion. It should be noted that the relative magnitudes of the point-biserial and bi-serial \bar{R} 's are not an issue in the procedures used here. A further change in the programming was to provide for the addition to the regression formulae of constants that would yield regression scores with distributions that would resemble those of the Navy Standard Score grading system--mean 50, S.D. 10.) The new regression formulae were used to compute regression scores at each stage of training on the non-officer and officer students who entered training during 1960. These scores were then correlated with the group's dichotomous (complete/attrite) criterion data. The comparative results of this cross validation are shown in Table III. (The coefficients given are bi-serial equivalents of the point-biserials actually computed.) Comparison of the magnitudes of the 1959 coefficients with the magnitudes of those obtained when the 1959 regression formulae were applied to 1960 cases is most reassuring as to the stability of the prediction relationships within successive samples.

Table III
Comparison of Original (1959) and Cross-Validation (1960) Validity Coefficients:
Complete/Attrite Criterion

NON-OFFICERS			OFFICERS		
Weeks	R 1959	r 1960	Weeks	R 1959	r 1960
1 and 2	.305	.297	1 and 2	.253	.347
3, 4, 5	.317	.300	3,4, 5	.275	.273
6, 7, 8	.336	.406	---	---	---
9, 10	.360	.410	---	---	---
11, 12, 13	.384	.448	---	---	---
14, 15, 16 and Pre-solo to hop #9	.407	.414	6 and Pre-solo to hop #9	.276	.296
Pre-solo hop #9 and after and PCN	.465	.394	Pre-solo, hop #9 and after and PCN	.464	.372
Transition	.424	.435	Transition	.477	.364
After transition	.450	.444	After transition	.461	.431

REVISED APPLICATION

Six months' experience with the student prediction system (as described earlier) had indicated that certain aspects of the system could be made more meaningful to the administrators using it. The changes made included the shift to predictor scores with means of 50 and S.D.'s of 10 mentioned earlier, and the development for each stage of training of graph-tables that would provide for easy interpretation of the meaning of a particular predictor score. These tables were included in a new Naval Air Basic Training Command instruction which was published in late August, 1963. The instruction is reproduced as Appendix E.

Continued employment of the student prediction system should result in easier, more efficient, and more accurate decisions on the part of administrative officers, which in turn should lead to increased efficiency in the utilization of training facilities and personnel and an attendant reduction in training costs.

APPENDIX A

Non-Officer Matrices, Multiple Correlations, and Beta Weights--

Pass/Fail and Pass/DOR Criteria

Non-Officer Matrix #1 - Weeks 1 and 2

	2	3	4	5	6	7	FAIL	DOR	MEAN	S.D.
1. AQT	.289	.171	-.017	.017	.077	.528	.222	-.036	76.53	13.21
2. MCT		.101	.033	-.043	-.075	.337	.202	.198	61.03	7.10
3. SAT			-.065	.033	.091	.095	.269	.050	20.52	5.50
4. BI				-.014	-.059	-.040	.119	.233	33.25	8.28
5. Age (mos.)					.565	.018	.085	-.088	262.94	18.12
6. Education						.077	.129	-.233	6.73	1.20
7. Math Test (I)							.165	.046	14.49	9.51

	Completed	Failed	DOR	Total
N	549	185	86	820

Shrunken Multiple R with Pass/Fail				Shrunken Multiple R with DOR			
Variable	Cum. R	Beta Weight	Variable	Cum. R	Beta Weight		
* SAT	.268	.40	BI	.232	.25		
* AQT	.320	.10	Educ.	.317	-1.91		
* BI	.347	.16	MCT	.359	.24		
* MCT	.368	.19	AQT	.364	.08		
* Educ.	.383	.92	SAT	.370	.14		
			Math (I)	.373	.06		
			Age	.374	.03		

Non-Officer Matrix #2 - Weeks 3, 4, and 5

	2	3	4	5	6	7	8	9	10	11	12	FAIL	DOR	MEAN	S.D.
1. AQT	.289	.171	-.017	.017	.077	.528	-.021	-.017	-.045	-.039	.020	.222	-.036	76.53	13.21
2. MCT		.101	.033	-.043	-.075	.337	-.062	-.014	-.033	.074	.041	.202	.198	61.03	7.10
3. SAT			-.065	.033	.091	.095	.033	.060	.007	.025	.097	.269	.050	20.52	5.50
4. BI				-.014	-.059	-.040	.049	-.020	.025	.044	.015	.119	.233	33.25	8.28
5. Age (mos.)					.565	.018	-.008	-.084	-.090	-.083	-.170	.085	-.088	262.94	18.12
6. Educ.						.077	.008	-.086	-.064	-.082	-.093	.129	-.233	6.73	1.20
7. Math (I)							.067	-.003	.014	-.006	.033	.165	.046	14.49	9.51
8. Jump Reach (I)								.198	.462	.253	.202	.144	-.061	11.02	2.77
9. Sit Ups (I)									.361	.338	.303	.099	-.001	8.31	5.81
10. Speed Agility (I)										.427	.335	.139	.062	10.66	4.40
11. Chins (I)											.274	.059	.131	5.69	2.89
12. Step Test (I)												.099	.049	5.74	3.27
	N				Completed		Failed		DOR		Total				
					549		185		86		820				

Shrunken Multiple R with Pass/Fail

Variable	Cum. R	Beta Weight
*SAT	.268	.53
*AQT	.320	.14
Speed Agility (I)	.350	.28
*BI	.373	.21
*MCT	.392	.29
*Educ.	.410	1.41
*Jump Reach (I)	.416	.42
Sit-Ups (I)	.417	.11

Shrunken Multiple R with DOR

Variable	Cum. R	Beta Weight
BI	.232	.35
Educ.	.317	-2.64
MCT	.359	.30
Chins (I)	.368	.49
Jump Reach (I)	.376	-.57
SAT	.379	.20
AQT	.384	-.11
Math (I)	.388	.10
Age	.390	.05
Speed Agility (I)	.391	.22
Sit-Ups	.393	-.13

Non-Officer Matrix #3 - Weeks 6, 7, and 8

	2	3	4	5	6	7	8	9	10	11	12	13	FAIL	DOR	MEAN	S.D.
1. AGT	.286	.169	-.020	.019	.078	.526	-.019	-.017	-.046	-.039	.023	.549	.230	-.036	76.50	13.19
2. MCT	.099	.030	-.041	-.074	.334	.334	-.060	-.013	-.033	.074	.044	.303	.209	.198	61.02	7.09
3. SAT		-.066	.034	.092	.093	.093	.034	.060	.007	.025	.099	.172	.273	.050	20.52	5.50
4. BI			-.012	-.058	-.044	-.044	.050	-.019	.025	.044	.017	-.105	.123	.233	33.24	8.28
5. Age (mos.)				.565	.021	.021	-.008	-.084	-.090	-.083	-.172	-.054	.083	-.088	262.96	18.12
6. Educ.					.079	.079	.007	-.086	-.063	-.082	-.095	.014	.123	-.233	6.73	1.20
7. Math (I)							.069	-.002	.014	-.007	.037	.715	.173	.046	14.47	9.49
8. Jump Reach (I)								.198	.463	.253	.201	.064	.141	-.061	11.02	2.77
9. Sit Ups (I)									.361	.338	.303	.042	.098	-.001	8.31	5.81
10. Speed Agility (I)										.427	.335	.025	.141	.062	10.65	4.40
11. Chins (I)											.274	.026	.059	.131	5.69	2.89
12. Step Test (I)												.085	.094	.049	5.74	3.26
13. Math (F)													.286	.010	47.49	10.22
	Completed										Total					
	549										86					
	Failed										184					
	N										819					

Shrunken Multiple R with Pass/Fail

Variable	Cum.R	Beta Weight
*Math (F)	.286	.35
*SAT	.364	.49
*BI	.398	.25
Speed Agility (I)	.416	.31
*Educ.	.430	1.13
*MCT	.446	.26
Math (I)	.452	-.19
*Jump Reach (I)	.455	.34
*AGT	.458	.08
Age	.459	.04
Sit-Ups (I)	.460	.10

Shrunken Multiple R with DOR

Variable	Cum.R	Beta Weight
BI	.232	.35
Educ.	.317	-2.64
MCT	.360	.30
Chins (I)	.370	.49
Jump Reach (I)	.378	-.58
SAT	.382	.20
AQT	.387	-.11
Math (I)	.390	.11
Age	.392	.05
Speed Agility (I)	.395	.23
Sit-Ups	.397	-.13

Non-Officer Matrix #4 - Weeks 9 and 10

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	FAIL	DOR	MEAN	S.D.
1. AQT	.289	.161	-.017	.001	.072	.519	-.017	-.013	-.038	-.031	.040	.544	.132	.538	-.039	-.065	.200	-.042	76.95	13.22
2. MCT		.118	.023	-.046	-.057	.328	-.072	-.034	-.043	.075	.048	.314	.085	.457	.031	.064	.186	.161	61.22	7.00
3. SAT			-.052	.023	.088	.089	.035	.067	.012	.035	.115	.161	.115	.110	.012	.044	.245	.077	20.59	5.47
4. BI				-.012	-.055	-.029	.059	-.016	.028	.061	.013	-.090	.116	-.055	.110	.119	.125	.249	33.19	8.18
5. Age (mos.)					.559	.003	-.023	-.111	-.103	-.093	-.206	-.085	.072	-.031	.000	-.034	.069	-.093	263.09	18.07
6. Educ.						.074	.004	-.097	-.079	-.084	-.116	-.001	-.067	.067	.031	-.024	.120	-.223	6.74	1.22
7. Math							.054	-.010	.013	-.001	.051	.704	.144	.587	-.014	-.015	.129	.041	15.08	9.47
8. Jump Reach (I)								.189	.452	.246	.201	.040	.128	-.035	.286	.351	.141	-.068	11.02	2.77
9. Sit-Ups (I)									.357	.345	.316	.034	.144	.021	.230	.363	.071	-.038	8.37	5.84
10. Speed Agility (I)										.412	.322	.017	.202	-.027	.384	.481	.135	.057	10.68	4.36
11. Chins (I)											.262	.029	.187	.068	.357	.576	.080	.129	5.67	2.88
12. Step Test (I)												.100	.115	.057	.164	.220	.083	.038	5.74	3.26
13. Math (F)													.214	.616	.052	.017	.229	.012	48.31	9.71
14. Peer Rating														.135	.215	.287	.364	.077	50.29	10.82
15. Physics															.035	.036	.191	.126	48.03	9.68
16. Trampoline																.647	.210	.078	30.10	5.99
17. Gymnastics																	.198	.068	31.73	5.74

Shrunken Multiple R with Pass/Fail				Shrunken Multiple R with DOR			
Variable	Cum. R	Beta Weight	Variable	Cum. R	Beta Weight	Variable	Beta Weight
* Peer Rating	.363	.15	BI	.249	.17		
* SAT	.415	.17	Educ.	.323	-.13		
* Trampoline	.436	.11	Physics	.355	.11		
* AQT	.455	.03	AQT	.373	-.07		
* Educ.	.467	.62	SAT	.387	.12		
* MCT	.478	.10	Jump Reach (I)	.394	-.24		
* BI	.486	.07	Chins (I)	.404	.20		
* Jump Reach (I)	.490	.17	Sit-Ups (I)	.412	-.10		
* Math (F)	.492	.09	MCT	.415	.06		
* Math (I)	.498	-.07	Speed Agility (I)	.418	.11		
Chins (I)	.499	-.09	Age	.419	.02		

Non-Officer Matrix #5 - Weeks 11 and 12

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	FAIL	DOR	MEAN	S.D.
1. AQT	.284	.160	-.016	.003	.074	.517	-.017	-.012	-.036	-.032	.036	.542	.131	.536	-.042	-.064	.419	.298	.191	-.042	76.99	13.28
2. MCT		.115	.024	.046	-.055	.324	-.073	-.033	-.041	.077	.040	.306	.084	.452	.026	.067	.259	.035	.170	.161	61.26	6.96
3. SAT			-.052	.022	.087	.086	.036	.066	.011	.039	.112	.157	.115	.108	.010	.044	.165	.006	.242	.077	20.60	5.47
4. BI				-.012	-.056	-.029	.059	-.017	.027	.062	.013	.091	.116	.054	-.110	.119	-.032	.086	.125	.249	33.19	8.18
5. Age (mos.)				.558		.002	-.023	-.112	-.105	-.090	-.207	-.086	.073	-.031	.000	-.035	.005	.027	.067	-.093	263.10	18.08
6. Educ.						.075	.005	-.099	-.080	-.082	.116	.000	.066	.069	.032	.025	.065	.007	.121	-.223	6.74	1.22
7. Math (I)							.054	-.010	.014	.000	.046	.703	.143	.585	-.017	.014	.377	.071	.119	.041	15.11	9.45
8. Jump Reach (I)								.189	.454	.246	.202	.041	.128	-.036	.286	.351	.005	.026	.143	-.068	11.02	2.77
9. Sit-Ups									.356	.348	.318	.018	.203	.145	.022	.230	.362	.005	.073	-.038	8.37	5.85
10. Speed Agility (I)										.416	.324	.018	.203	-.025	.385	.481	.044	.022	.137	.057	10.63	4.36
11. Chins (I)											.265	.034	.187	.070	.359	.579	.009	-.014	.085	.129	5.65	2.88
12. Step Test (I)												.092	.115	.051	.162	.222	.102	-.003	.073	.038	5.75	2.88
13. Math (F)													.214	.613	.047	.019	.478	.096	.214	.012	48.37	9.66
14. Peer Rating													.214	.134	.214	.288	.252	.083	.363	.077	50.29	10.83
15. Physics														.032	.032	.039	.032	.176	.178	.126	48.08	9.65
16. Trampoline																.649	.005	-.056	.206	.126	30.11	5.99
17. Gymnastics																		-.030	.203	.068	31.72	5.99
18. Navigation																			.390	.058	48.89	6.80
19. Study Skills																		.150	.077	.025	47.77	10.54

Shrunken Multiple R with Pass/Fail			Shrunken Multiple R with DOR		
Variable	Cum. R	Beta Weight	Variable	Cum. R	Beta Weight
Navigation	.390	.25	BI	.249	.17
Peer Rating	.475	.13	Educ.	.323	-.14
SAT	.497	.16	Physics	.355	.11
Trampoline	.518	.10	AQT	.373	-.07
BI	.526	.07	SAT	.387	.12
Educ.	.534	.51	Jump Reach (1)	.393	-.24
MCT	.536	.07	Chins (1)	.403	.20
Jump Reach (1)	.539	.15	Sit-Ups (1)	.411	-.11
Math (1)	.541	-.05	MCT	.414	.06
			Speed Agility (1)	.417	.11
			Age	.418	.02

Non-Officer Matrix #6 - Week 13

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	FAIL	DOR	MEAN	S.D.
1. AGT	.284	.160	-.016	.003	.074	.517	.017	-.012	-.036	-.032	.036	.542	.131	.536	-.042	-.064	.419	.298	-.026	-.015	-.045	-.071	.017	.191	-.042	76.99	13.28
2. MCT		.115	-.024	-.046	-.055	.324	-.073	-.033	-.041	.077	.040	.306	.084	.452	.026	.067	.259	.035	-.044	-.035	-.067	.040	.072	.170	.161	61.26	6.96
3. SAT			-.052	.022	.087	.086	.036	.066	.011	.039	.112	.157	.115	.108	.010	.044	.165	.006	.039	.052	-.012	.009	-.024	.242	.077	20.60	5.47
4. BI				-.012	-.056	-.029	.059	-.017	.027	.062	.013	.091	.116	-.054	.110	.119	.032	.066	.060	.010	-.002	.081	-.027	.125	.249	33.19	8.18
5. Age					.558	.002	-.023	-.112	-.105	-.090	-.207	-.086	.073	.031	.000	-.035	.005	-.027	.019	-.060	.046	-.075	-.052	.067	-.093	263.10	18.08
6. Educ.						.075	.005	-.099	-.080	-.082	-.116	.000	-.066	.069	.032	-.025	.085	.007	.040	-.091	-.043	-.058	-.033	.121	-.223	6.74	1.22
7. Math (I)							.054	-.010	.014	.000	.046	.703	.143	.585	-.017	-.014	.377	.071	.024	.010	-.012	-.008	.042	.119	.041	15.11	9.45
8. Jump Reach (I)								.189	.454	.246	.318	.202	.041	.128	-.036	.286	.351	.027	.026	.726	.032	.426	.245	.143	-.068	11.02	2.77
9. Sit-Ups (I)									.356	.348	.318	.035	.145	.022	.230	.362	.005	.009	.141	.572	.228	.263	.077	.073	-.038	8.37	5.85
10. Speed Agility (I)										.416	.324	.018	.203	-.025	.385	.481	.044	.022	.436	.096	.678	.341	.087	.137	.057	10.68	4.36
11. Chins (I)											.265	.034	.187	.070	.359	.579	.009	-.014	.192	.132	.278	.819	.089	.085	.129	5.66	2.88
12. Step Test (I)												.092	.115	.051	.162	.222	.102	.003	.165	.115	.189	.208	.165	.073	.038	5.75	3.26
13. Math (F)													.214	.613	.047	.019	.478	.096	.020	.062	.013	-.007	.061	.214	.012	48.37	9.66
14. Peer Rating														.134	.032	.288	.252	.083	.134	.127	.198	.172	.005	.363	.077	50.29	10.83
15. Physics																.649	.457	.176	-.037	.046	-.026	.051	.072	.178	.126	48.08	9.65
16. Trampoline																	.032	-.056	.311	.123	.377	.370	.093	.206	.078	30.11	5.99
17. Gymnastics																	.005	.030	.340	.213	.458	.600	.073	.203	.068	31.72	5.74
18. Navigation																		.150	.020	.047	.040	-.015	.038	.390	.058	48.89	6.80
19. Study Skills																			-.008	.049	.003	.235	.054	.105	-.062	47.77	10.54
20. Jump Reach (O)																								.077	.025	11.51	2.52
21. Sit-Ups (O)																								.070	.010	15.75	4.77
22. Speed Agility (O)																								.131	.074	11.69	3.79
23. Chins (O)																								.071	.020	8.06	3.12
24. Step Test (O)																								.022	.071	7.91	.78

Shrunken Multiple R with Pass/Fail

Variable	Cum. R	Beta Weight
* Navigation	.390	.25
* Peer Rating	.475	.13
* SAT	.499	.16
* Trampoline	.518	.10
* BI	.526	.07
* Education	.534	.51
* MCT	.536	.07
* Jump Reach (I)	.539	.15
Math (I)	.541	-.05

Shrunken Multiple R with DOR

Variable	Cum. R	Beta Weight
BI	.249	.28
Educ.	.323	-1.63
Physics	.355	.19
AGT	.373	-.11
SAT	.387	.20
Jump Reach (I)	.393	-.41
Speed Agility (O)	.406	.28
Sit-Ups (I)	.412	-.25
Chins (I)	.422	1.14
Chins (O)	.454	-.96
Step Test (O)	.456	.60
MCT	.459	.09
Sit-Ups (O)	.460	.12
Math (F)	.462	-.11
Trampoline	.463	.09
Math (I)	.464	.07

Non-Officer Matrix #7 - Week 14

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	FAIL	DOR	MEAN	S.D.
1. AGT	.284	.160	-.016	.003	.074	.517	-.017	-.012	-.036	-.032	.036	.542	.131	.536	-.042	-.064	.419	.298	-.026	-.015	-.045	-.071	.017	.271	.191	-.042	76.99	13.28
2. MCT		.115	.024	-.046	-.055	.324	-.073	-.033	-.041	.077	.040	.306	.084	.452	.026	.067	.239	.035	-.044	-.035	-.067	.040	.072	.406	.170	.161	61.26	6.96
3. SAT			-.052	.022	-.087	.086	.036	.066	.011	.039	.112	.157	.115	.108	.010	.044	.165	.006	.039	.052	-.012	.009	-.024	.049	.242	.077	20.60	5.47
4. BI				-.012	-.056	-.029	.059	-.017	.027	.062	.013	-.091	.116	-.054	.110	.119	.032	.086	.060	-.010	-.002	.081	-.027	.058	.125	-.249	33.19	8.18
5. Age					.558	.002	-.023	-.112	-.105	-.090	-.207	-.086	.073	-.031	.000	-.035	.005	.027	.019	-.060	-.046	-.075	-.052	.176	.067	-.093	263.10	18.08
6. Educ.						.075	.005	-.099	-.080	-.082	-.116	.000	-.066	.069	.032	-.025	.085	.007	.040	-.091	-.043	-.058	-.033	.204	.121	-.223	6.74	1.22
7. Math (I)							.054	-.010	.014	.000	.046	.703	.143	.585	-.017	-.014	.377	.071	.024	-.010	-.012	-.008	.042	.216	.119	.041	15.11	9.45
8. Jump Reach (I)								.189	.454	.246	.202	.041	.128	-.036	.286	.351	.027	-.026	.726	.032	.426	.245	.078	-.052	.143	-.068	11.02	2.77
9. Sit-Ups (I)									.356	.348	.318	.035	.145	.022	.230	.362	.005	.009	.141	.572	.228	.263	.077	-.023	.073	-.038	8.37	5.85
10. Speed Agility (I)										.416	.324	.018	.203	-.025	.385	.481	.044	.022	.436	.076	.678	.341	.087	-.085	.137	.057	10.68	4.36
11. Chins (I)											.092	.092	.115	.051	.162	.222	.102	-.003	.165	.115	.189	.208	.165	-.033	.085	.129	5.66	2.88
12. Step Test (I)													.214	.613	.047	.019	.478	.096	.020	.062	.013	-.007	.061	.221	.214	.012	48.37	9.66
13. Math (F)														.134	.032	.039	.457	.176	-.037	.046	-.026	.051	.072	.507	.363	.077	50.29	10.83
14. Peer Rating																.649	.032	-.056	.311	.123	.377	.370	.093	.032	.206	.078	30.11	5.99
15. Physics																	.005	-.030	.340	.213	.458	.600	.073	.024	.203	.068	31.72	5.74
16. Trampoline																		.150	.020	-.003	.005	-.009	.031	.408	.390	.058	48.89	6.80
17. Gymnastics																			-.008	.049	.042				.105	.025	47.77	10.54
18. Navigation																											11.51	2.52
19. Study Skills																											15.75	4.77
20. Jump Reach (O)																											11.00	3.79
21. Sit-Ups (O)																											11.00	3.79
22. Speed Agility (O)																											8.06	3.12
23. Chins (O)																											7.91	7.8
24. Step Test (O)																											49.91	8.28
25. Engineering																												

Shrunken Multiple R with DOR

Shrunken Multiple R with Pass/Fail

Variable	Cum. R	Beta Weight
Navigation	.390	.34
Peer Rating	.475	.19
Engineering	.505	.24
SAT	.530	.28
Trampoline	.547	.17
BI	.553	.09
Physics	.559	-.09
Jump Reach (I)	.561	.23
Educ.	.564	.47
BI	.249	.27
Educ.	.323	-.84
Engineering	.368	.13
SAT	.380	.21
AGT	.388	-.11
Physics	.404	.15
Jump Reach (I)	.410	-.43
Speed Agility (O)	.423	.29
Sit-Ups (I)	.427	-.24
Chins (I)	.436	1.10
Chins (O)	.463	-.91
Step Test (O)	.465	.64
Trampoline	.465	.09
Math (F)	.466	-.10
Math (I)	.469	.09
Sit-Ups (O)	.470	.11

Non-Officer Matrix #8 - Weeks 15 and 16, and Pre-Solo prior to hop #9

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	FAIL	DOR	MEAN	S.D.				
1. AGT	.284	.160	-.016	.003	.074	.517	-.017	-.012	-.036	-.032	.036	.542	.131	.536	-.042	-.064	.419	.298	-.026	-.015	-.045	-.071	.017	.271	.606	.257	.395	-.295	.191	-.042	76.99	13.28				
2. MCT		.115	.024	-.046	-.065	.304	-.373	.033	-.041	.077	.040	.306	.084	.452	.026	.067	.299	.035	-.044	.035	-.067	.040	.072	.406	.440	.243	.058	.111	.170	.161	61.26	6.96				
3. SAT			-.052	.022	-.087	.086	.036	.046	.011	.039	.112	.157	.115	.108	.010	.044	.165	.006	.039	.052	-.012	.009	-.074	.059	.144	.052	.064	.054	.242	.077	20.60	5.47				
4. BI				-.012	-.056	-.029	.059	.017	.027	.062	.013	-.091	.116	.054	.110	.119	.032	.086	.060	.010	-.002	.081	-.057	.058	.070	.066	.034	.055	.125	.249	33.19	8.18				
5. Age					.336	.002	-.023	-.112	-.105	-.090	.207	-.086	.073	.031	.000	.035	.005	.027	.019	-.060	-.046	-.073	.052	.176	.043	.157	.103	.037	.067	-.093	263.10	18.08				
6. Education						.075	.005	-.099	-.080	-.082	-.116	.003	-.066	.069	.032	.025	.085	.007	.040	-.091	-.043	-.058	.033	.204	.062	.224	.170	.138	.121	-.223	6.74	1.22				
7. Math (I)							.054	-.010	.014	.000	.046	.703	.143	.585	-.017	.014	.377	.071	.024	-.010	-.012	-.008	.042	.216	.702	.135	.140	.114	.119	-.041	15.11	9.45				
8. Jump Reach (I)								.189	.356	.416	.265	.035	.145	.022	.230	.362	.005	.009	.141	.572	.228	.263	.341	.087	.083	.019	.100	.081	.015	.085	129	5.66				
9. Sit-Ups (I)												.018	.203	.025	.385	.481	.044	.022	.436	.096	.678	.819	.089	.165	.044	.057	.008	.030	.011	.073	5.75	3.26				
10. Speed Agility (I)												.034	.187	.070	.359	.579	.009	-.014	.192	.132	.278	.115	.189	.208	.061	.121	.194	.107	.104	.314	48.37	9.66				
11. Chins (I)												.092	.214	.613	.047	.019	.478	.096	.020	.062	.013	.198	.172	.065	.127	.194	.107	.106	.108	.072	50.29	10.83				
12. Step Test (I)														.134	.134	.032	.039	.457	.176	-.037	.046	-.026	.051	.072	.307	.923	.311	.263	.266	.78	125	45.06	9.65			
13. Math (F)																.649	.005	.032	-.056	.311	.123	.377	.370	.093	.032	.030	.082	-.076	.001	.006	30.11	5.99				
14. Peer Rating																				.005	-.030	.340	.213	.458	.600	.073	.024	.032	.020	-.115	.090	.390	31.72	5.74		
15. Physics																								.169	.168	.149	.313	.272	.025	.077	.025	47.77	10.54	6.80		
16. Trampoline																								.408	.528	.241	.370	.272	.025	.077	.025	47.77	10.54	6.80		
17. Gymnastics																								.015	.038	.169	.149	.313	.272	.025	.077	.025	47.77	10.54	6.80	
18. Navigation																								.005	.009	.031	.168	.149	.313	.272	.025	.077	.025	47.77	10.54	6.80
19. Study Skills																								.005	.009	.031	.168	.149	.313	.272	.025	.077	.025	47.77	10.54	6.80
20. Jump Reach (O)																								.005	.009	.031	.168	.149	.313	.272	.025	.077	.025	47.77	10.54	6.80
21. Sit-Ups (O)																								.005	.009	.031	.168	.149	.313	.272	.025	.077	.025	47.77	10.54	6.80
22. Speed Agility (O)																								.005	.009	.031	.168	.149	.313	.272	.025	.077	.025	47.77	10.54	6.80
23. Chins (O)																								.005	.009	.031	.168	.149	.313	.272	.025	.077	.025	47.77	10.54	6.80
24. Step Test (O)																								.005	.009	.031	.168	.149	.313	.272	.025	.077	.025	47.77	10.54	6.80
25. Engineering																								.005	.009	.031	.168	.149	.313	.272	.025	.077	.025	47.77	10.54	6.80
26. Aerodynamics																								.005	.009	.031	.168	.149	.313	.272	.025	.077	.025	47.77	10.54	6.80
27. Physiology																								.005	.009	.031	.168	.149	.313	.272	.025	.077	.025	47.77	10.54	6.80
28. Naval Orientation																								.005	.009	.031	.168	.149	.313	.272	.025	.077	.025	47.77	10.54	6.80
29. Leadership																								.005	.009	.031	.168	.149	.313	.272	.025	.077	.025	47.77	10.54	6.80

Shrunken Multiple R with DOR

Variable	Cum. R	Beta Weight
BI	.249	.26
Educ.	.323	-.177
Engineering	.368	.07
SAT	.380	.21
AGT	.388	-.13
Physics	.401	.11
Physiology	.414	.13
Jump Reach (I)	.419	-.44
Speed Agility (O)	.433	.29
Sit-Ups (I)	.437	-.23
Chins (I)	.446	.12
Chins (O)	.473	-.94
Step Test (O)	.475	.61
Leadership	.477	.09
Math (I)	.478	.10
Math (F)	.480	-.09
Trampoline	.481	.08
Sit-Ups (O)	.481	.09

Shrunken Multiple R with Pass/Fail

Variable	Cum. R	Beta Weight
*Navigation	.390	.34
*Peer Rating	.475	.19
*Engineering	.505	.24
*SAT	.530	.28
*Trampoline	.547	.17
*BI	.553	.09
*Physics	.559	-.09
*Jump Reach (I)	.561	.23
*Educ.	.564	.47

Non-Officer Matrix #9 - Para-volo Hop #9 and other and Precision

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	FAIL	DOR	MEAN	S.D.
1. AGT	.279	.140	-.007	-.002	-.009	.504	-.007	-.022	-.058	-.051	.041	.535	.127	.538	-.055	-.085	.394	.288	-.042	-.018	-.057	-.074	.018	-.272	.405	.265	.304	.291	-.051	-.145	.006	76.94	13.31
2. NCT		.109			-.053	.341	-.070	-.044	-.038	-.057	.020	.322	.072	.450	-.003	.038	.245	.025	-.048	-.039	-.072	.021	.063	.396	.447	.239	.032	.114	.109	-.118	-.118	.61.51	6.91
3. SAT				-.000	.003	.086	.104	.014	.054	.009	.026	.105	.144	.072	.111	.000	.029	.148	.010	.021	.040	.029	.005	-.023	.028	.151	.054	.045	.041	-.111	-.047	20.73	5.45
4. B1					-.053	.086	.104	.014	.054	.009	.026	.105	.144	.072	.111	.000	.029	.148	.010	.021	.040	.029	.005	-.023	.028	.151	.054	.045	.041	-.111	-.047	20.73	5.45
5. Age						.371	.010	-.023	-.014	-.097	-.089	-.202	-.101	.060	.041	.012	.043	.009	.040	.004	.070	.043	.077	.176	.056	.164	.104	.040	.007	-.081	-.109	33.32	8.17
6. Educ.						.086	-.012	-.091	-.084	-.086	-.114	.008	-.048	.075	.014	.043	.008	.011	.014	.078	.041	.067	.045	.200	.062	.237	.184	.144	.012	-.145	-.223	26.91	18.19
7. Math (I)						.048	-.031	-.007	-.013	.058	.098	.139	.580	.320	.037	.030	.372	.050	.028	.027	.028	.013	.044	.238	.697	.142	.143	.117	.014	-.126	-.062	6.73	1.22
8. Jump Beach (I)							.176		.351		.343	.314	.010	.105	.002	.220	.355	.019	.036	.450	.069	.671	.216	.250	.060	.032	.000	.034	.058	-.023	-.034	11.06	2.76
9. Sit-Up (I)											.404	.324	.011	.188	.046	.377	.479	.019	.036	.450	.069	.671	.216	.250	.060	.032	.000	.034	.058	-.023	-.034	11.06	2.76
10. Speed Agility (I)											.242	.109	.094	.055	.151	.000	.438	.565	.050	.027	.195	.108	.272	.819	.084	.011	.030	.002	.118	.107	.008	10.42	4.38
11. Chin (I)												.109	.094	.055	.151	.000	.438	.565	.050	.027	.195	.108	.272	.819	.084	.011	.030	.002	.118	.107	.008	10.42	4.38
12. Step Test (I)												.109	.094	.055	.151	.000	.438	.565	.050	.027	.195	.108	.272	.819	.084	.011	.030	.002	.118	.107	.008	10.42	4.38
13. Math (F)												.109	.094	.055	.151	.000	.438	.565	.050	.027	.195	.108	.272	.819	.084	.011	.030	.002	.118	.107	.008	10.42	4.38
14. Peer Rating												.109	.094	.055	.151	.000	.438	.565	.050	.027	.195	.108	.272	.819	.084	.011	.030	.002	.118	.107	.008	10.42	4.38
15. Physics												.109	.094	.055	.151	.000	.438	.565	.050	.027	.195	.108	.272	.819	.084	.011	.030	.002	.118	.107	.008	10.42	4.38
16. Gymnastics												.109	.094	.055	.151	.000	.438	.565	.050	.027	.195	.108	.272	.819	.084	.011	.030	.002	.118	.107	.008	10.42	4.38
17. Trampoline												.109	.094	.055	.151	.000	.438	.565	.050	.027	.195	.108	.272	.819	.084	.011	.030	.002	.118	.107	.008	10.42	4.38
18. Navigation												.109	.094	.055	.151	.000	.438	.565	.050	.027	.195	.108	.272	.819	.084	.011	.030	.002	.118	.107	.008	10.42	4.38
19. Study Skill												.109	.094	.055	.151	.000	.438	.565	.050	.027	.195	.108	.272	.819	.084	.011	.030	.002	.118	.107	.008	10.42	4.38
20. Jump Beach (O)												.109	.094	.055	.151	.000	.438	.565	.050	.027	.195	.108	.272	.819	.084	.011	.030	.002	.118	.107	.008	10.42	4.38
21. Sit-Up (O)												.109	.094	.055	.151	.000	.438	.565	.050	.027	.195	.108	.272	.819	.084	.011	.030	.002	.118	.107	.008	10.42	4.38
22. Speed Agility (O)												.109	.094	.055	.151	.000	.438	.565	.050	.027	.195	.108	.272	.819	.084	.011	.030	.002	.118	.107	.008	10.42	4.38
23. Chin (O)												.109	.094	.055	.151	.000	.438	.565	.050	.027	.195	.108	.272	.819	.084	.011	.030	.002	.118	.107	.008	10.42	4.38
24. Step Test (O)												.109	.094	.055	.151	.000	.438	.565	.050	.027	.195	.108	.272	.819	.084	.011	.030	.002	.118	.107	.008	10.42	4.38
25. Engineering												.109	.094	.055	.151	.000	.438	.565	.050	.027	.195	.108	.272	.819	.084	.011	.030	.002	.118	.107	.008	10.42	4.38
26. Aerodynamics												.109	.094	.055	.151	.000	.438	.565	.050	.027	.195	.108	.272	.819	.084	.011	.030	.002	.118	.107	.008	10.42	4.38
27. Physiology												.109	.094	.055	.151	.000	.438	.565	.050	.027	.195	.108	.272	.819	.084	.011	.030	.002	.118	.107	.008	10.42	4.38
28. Nutrition												.109	.094	.055	.151	.000	.438	.565	.050	.027	.195	.108	.272	.819	.084	.011	.030	.002	.118	.107	.008	10.42	4.38
29. Mental Orientation												.109	.094	.055	.151	.000	.438	.565	.050	.027	.195	.108	.272	.819	.084	.011	.030	.002	.118	.107	.008	10.42	4.38
30. Para-volo Flight												.109	.094	.055	.151	.000	.438	.565	.050	.027	.195	.108	.272	.819	.084	.011	.030	.002	.118	.107	.008	10.42	4.38

Completed				Failed				Total			
502				116				672			
Shrunken Multiple R with Pass/Fail				Shrunken Multiple R with DOR				Shrunken Multiple R with DOR			
Cum. R				Beta Weight				Cum. R			
Variable				Variable				Variable			
• Para-volo Flight				B1				B1			
• Peer Rating				Educ.				Educ.			
• Navigation				Para-volo Flight				Para-volo Flight			
• Educ.				Physics				Physics			
• SAT				Jump Beach (I)				Jump Beach (I)			
• Math (F)				Speed Agility (O)				Speed Agility (O)			
• Engineering				Physiology				Physiology			
• Trampoline				Sit-Up (I)				Sit-Up (I)			
• Chin (O)				Chin (I)				Chin (I)			
• Step Test (O)				Peer Rating				Peer Rating			
• Aerodynamics				Speed Agility				Speed Agility			
• Physiology				Gymnastics				Gymnastics			
• Nutrition				SAT				SAT			
• Mental Orientation				Naval Orientation				Naval Orientation			
• Para-volo Flight				Math (I)				Math (I)			
				Math (F)				Math (F)			
				Engineering				Engineering			
				Jump Beach (O)				Jump Beach (O)			
				Sit-Up (O)				Sit-Up (O)			

Non-Officer Matrix #10 - Transition

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	FAIL	DOR	MEAN	S.D.	
1. AGT	.288	.154	-.004	.002	.085	.306	-.041	-.031	-.049	-.043	.052	.535	.127	.529	-.056	-.093	.401	.295	-.038	-.022	-.064	-.075	.019	.276	.599	.262	.381	.379	-.052	.039	.139	.005	77.12	13.48	
2. MCT		.110	-.042	-.039	-.049	.330	-.060	-.037	-.046	.048	.021	.316	.045	.467	.005	.004	.245	.023	-.028	-.028	-.081	.108	.069	.415	.456	.257	.055	.128	.049	.142	.070	.040	41.73	6.88	
3. SAT			.098	.012	.084	.098	.022	.056	-.010	.059	.104	.158	.073	.098	.006	.032	.161	.008	.041	.042	-.026	.023	.021	.017	.139	.047	.031	.126	.049	.177	.171	.025	30.84	5.46	
4. BI				-.006	.570	.019	-.003	.067	.000	.018	.053	.013	.081	.140	-.035	.066	.122	.033	.077	.079	.007	-.023	.064	.043	.053	.070	.035	.026	.241	.271	.130	.195	33.47	8.15	
5. Age						.092	-.021	.107	.097	.106	.189	.099	.048	.052	.017	.041	.017	.045	.009	.071	.043	.095	.081	.167	.063	.153	.087	.041	.000	.019	.049	.048	242.86	18.08	
6. Education							.092	-.011	-.111	-.076	-.111	.120	.013	.069	.058	.007	-.058	.089	.018	.021	.084	.036	.091	.047	.173	.048	.230	.177	.134	.019	.039	.127	.302	4.73	1.26
7. Math (I)							.056	-.000	.002	.006	.057	.094	.121	.983	.022	.031	.368	.050	.035	.034	.017	.012	.048	.230	.160	.140	.130	.114	.049	.026	.101	.004	15.28	9.55	
8. Jump Beach (I)								.174	.469	.233	.182	.029	.089	.063	.241	.320	.008	.023	.717	.033	.435	.234	.071	.074	.018	.017	.044	.025	.016	.004	.136	11.04	2.78		
9. Sit-Up (I)									.364	.403	.323	.019	.176	.044	.365	.467	.000	.040	.473	.099	.678	.333	.108	.094	.088	.053	.058	.027	.043	.051	.058	.029	8.46	5.85	
10. Speed Agility (I)											.237	.117	.175	.097	.065	.147	.201	.098	.000	.152	.085	.199	.179	.132	.104	.094	.008	.053	.058	.027	.043	.051	10.46	4.35	
11. China (I)																		.045	.201	.103	.256	.818	.091	.032	.032	.010	.126	.049	.009	.048	.073	.102	5.74	2.80	
12. Step Test (I)																		.043	.074	.028	.079	.013	.028	.066	.230	.160	.107	.099	.116	.049	.042	.022	.073	2.76	3.36
13. Math (F)																		.045	.074	.028	.079	.013	.028	.066	.230	.160	.107	.099	.116	.049	.042	.022	.073	48.34	10.44
14. Peer Rating																		.045	.074	.028	.079	.013	.028	.066	.230	.160	.107	.099	.116	.049	.042	.022	.073	30.76	5.86
15. Physics																		.045	.074	.028	.079	.013	.028	.066	.230	.160	.107	.099	.116	.049	.042	.022	.073	40.41	6.44
16. Trampoline																		.045	.074	.028	.079	.013	.028	.066	.230	.160	.107	.099	.116	.049	.042	.022	.073	30.35	5.80
17. Gymnastics																		.045	.074	.028	.079	.013	.028	.066	.230	.160	.107	.099	.116	.049	.042	.022	.073	30.35	5.80
18. Navigation																		.045	.074	.028	.079	.013	.028	.066	.230	.160	.107	.099	.116	.049	.042	.022	.073	30.35	5.80
19. Study Skills																		.045	.074	.028	.079	.013	.028	.066	.230	.160	.107	.099	.116	.049	.042	.022	.073	30.35	5.80
20. Jump Beach (O)																		.045	.074	.028	.079	.013	.028	.066	.230	.160	.107	.099	.116	.049	.042	.022	.073	30.35	5.80
21. Sit-Up (O)																		.045	.074	.028	.079	.013	.028	.066	.230	.160	.107	.099	.116	.049	.042	.022	.073	30.35	5.80
22. Speed Agility (O)																		.045	.074	.028	.079	.013	.028	.066	.230	.160	.107	.099	.116	.049	.042	.022	.073	30.35	5.80
23. China (O)																		.045	.074	.028	.079	.013	.028	.066	.230	.160	.107	.099	.116	.049	.042	.022	.073	30.35	5.80
24. Step Test (O)																		.045	.074	.028	.079	.013	.028	.066	.230	.160	.107	.099	.116	.049	.042	.022	.073	30.35	5.80
25. Engineering																		.045	.074	.028	.079	.013	.028	.066	.230	.160	.107	.099	.116	.049	.042	.022	.073	30.35	5.80
26. Aerodynamics																		.045	.074	.028	.079	.013	.028	.066	.230	.160	.107	.099	.116	.049	.042	.022	.073	30.35	5.80
27. Physiology																		.045	.074	.028	.079	.013	.028	.066	.230	.160	.107	.099	.116	.049	.042	.022	.073	30.35	5.80
28. Naval Orientation																		.045	.074	.028	.079	.013	.028	.066	.230	.160	.107	.099	.116	.049	.042	.022	.073	30.35	5.80
29. Leadership																		.045	.074	.028	.079	.013	.028	.066	.230	.160	.107	.099	.116	.049	.042	.022	.073	30.35	5.80
30. Pre-solo Flight																		.045	.074	.028	.079	.013	.028	.066	.230	.160	.107	.099	.116	.049	.042	.022	.073	30.35	5.80
31. Precision																		.045	.074	.028	.079	.013	.028	.066	.230	.160	.107	.099	.116	.049	.042	.022	.073	30.35	5.80

Shrunken Multiple R with DOR

Variable	Cum. R	Beta Weight
Precision	.241	.16
Education	.305	-.242
Naval Orientation	.357	.18
BI	.383	.22
Jump Beach (I)	.407	-.96
Speed Agility (O)	.465	.45
Physiology	.482	.20
Study Skills	.493	-.09
Physics	.499	.25
Math (F)	.512	-.11
SAT	.519	.21
Gymnastics	.526	-.28
China (I)	.537	.01
Speed Agility (I)	.548	.46
Sit-Up (I)	.554	-.16
AGT	.559	-.07
China (O)	.562	.68
MCT	.576	-.13
Step Test (I)	.581	-.16
Step Test (O)	.582	.68
Age	.584	.04
Peer Rating	.585	-.05

Shrunken Multiple R with Pass/Fail

Variable	Cum. R	Beta Weight
Precision	.364	.18
Peer Rating	.451	.19
Navigation	.487	.16
Pre-solo	.517	.18
Education	.534	.84
Jump Beach (I)	.544	.33
Trampoline	.551	.18
China (O)	.554	-.21
Math (F)	.558	.13
Sit-Up (O)	.559	-.12
SAT	.561	.11
Engineering	.564	.15
MCT	.566	-.07
Physics	.569	-.10

Non Officer Matrix #11 - After Transition

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	FAIL	DOR	MEAN	S.D.
1. AGT	.277																																		
2. MCT	.159	.000																																	
3. SAT	.109	.037	.034																																
4. BI																																			
5. Age																																			
6. Education																																			
7. Math (I)																																			
8. Jump Reach (I)																																			
9. Sit-Ups (I)																																			
10. Speed Agility (I)																																			
11. Chins (I)																																			
12. Ship Test (I)																																			
13. Math (F)																																			
14. Peer Rating																																			
15. Physics																																			
16. Trampoline																																			
17. Gymnastics																																			
18. Navigation																																			
19. Study Skills																																			
20. Jump Reach (O)																																			
21. Sit-Ups (O)																																			
22. Speed Agility (O)																																			
23. Chins (O)																																			
24. Ship Test (O)																																			
25. Engineering																																			
26. Aerodynamics																																			
27. Physiology																																			
28. Naval Orientation																																			
29. Leadership																																			
30. Pre-solo																																			
31. Precision																																			
32. Transition																																			

Strunked Multiple R with Pass/Fail
Strunked Multiple R with DOR
(Number of DOR cases is too small)

Variable	Cum. R	Beta Weight
*Transition	.442	.32
*Peer Rating	.509	.16
*Navigation	.527	.11
*Trampoline	.541	.30
*Pre-solo	.555	.14
*SAT	.561	.17
Chins (O)	.566	-.32
Jump Reach (I)	.573	-.54
Engineering	.577	.11
Math (F)	.580	.08
Education	.581	.54

APPENDIX B

Officer Matrices, Multiple Correlations, and Beta Weights--

Pass/Fail and Pass/DOR Criteria

Officer Matrix #1 - Weeks 1 and 2

	2	3	4	5	FAIL	DOR	MEAN	S.D.
1. AQT	.370	.268	.028	.426	.141	.159	85.01	13.35
2. MCT		.270	.200	.233	.244	.234	61.20	7.83
3. SAT			.124	.123	.160	.139	20.06	6.03
4. BI				-.091	.103	.122	31.88	8.52
5. Math (I)					.095	.240	46.35	16.48
	Completed		Failed		DOR	Total		
N	582		107		77	766		

Shrunken Multiple R with Pass/Fail			Shrunken Multiple R with DOR		
Variable	Cum. R	Beta Weight	Variable	Cum. R	Beta Weight
* MCT	.245	.42	Math (I)	.241	.21
* SAT	.260	.26	MCT	.299	.31
* BI	.261	.11	BI	.315	.20
* Math (I)	.262	.04	SAT	.317	.16

Officer Matrix #2 - Weeks 3 and 4

	2	3	4	5	6	7	8	9	10	FAIL	DOR	MEAN	S.D.
1. AQT	.370	.268	.028	.426	-.032	-.125	-.112	-.098	-.047	.141	.159	85.01	13.35
2. MCT		.270	.200	.233	.012	-.069	-.027	.017	.033	.244	.234	61.20	7.83
3. SAT			.124	.123	-.035	-.033	.023	.003	.056	.160	.139	20.06	6.03
4. BI				-.091	.068	.023	.063	.142	.013	.103	.122	31.88	8.52
5. Math (I)					-.126	-.073	-.049	-.061	-.012	.095	.240	46.35	16.48
6. Jump Reach (I)						.220	.408	.218	.193	.102	-.046	10.99	2.47
7. Sit-Ups (I)							.366	.456	.345	.016	.036	10.19	6.12
8. Speed Agility (I)								.433	.406	.095	.026	10.77	4.28
9. Chins (I)									.364	.131	.165	6.42	3.32
10. Step Test (I)										.111	.071	5.56	3.33

	Completed	Failed	DOR	Total
N	582	107	77	766

Shrunken Multiple R with Pass/Fail

Variable	Cum. R	Beta Weight
MCT	.245	.35
Chins (I)	.273	.49
SAT	.287	.22
Jump Reach (I)	.295	.47
Math (I)	.297	.04
Step Test (I)	.298	.25
Sit-Ups (I)	.300	-.12

Shrunken Multiple R with DOR

Variable	Cum. R	Beta Weight
Math (I)	.241	.18
Chins (I)	.297	.75
MCT	.344	.27
BI	.352	.14
Jump Reach (I)	.355	-.36
SAT	.358	.14

Officer Matrix #3 - Week 5

	2	3	4	5	6	7	8	9	10	11	FAIL	DOR	MEAN	S.D.
1. AQT	.368	.267	.027	.426	-.029	-.124	-.112	-.096	-.045	.224	.142	.162	84.98	13.34
2. MCT		.269	.199	.233	.016	-.067	-.026	.020	.035	.306	.243	.240	61.18	7.82
3. SAT			.124	.123	-.033	-.032	.024	.004	.058	.103	.159	.139	20.06	6.03
4. BI				-.091	.069	.023	.063	.142	.014	.156	.102	.121	31.87	8.53
5. Math (1)					-.126	-.073	-.049	-.060	-.011	-.019	.094	.240	46.34	16.49
6. Jump Reach (1)						.219	.498	.216	.190	-.034	.104	-.043	11.00	2.46
7. Sit-Ups (1)							.366	.455	.344	.004	.017	.036	10.20	6.12
8. Speed Agility								.433	.406	-.038	.096	.028	10.78	4.28
9. Chins (1)									.363	.068	.135	.168	6.43	3.31
10. Step Test (1)										-.010	.112	.073	5.57	3.33
11. Physiology											.270	.116	52.46	8.35

	Completed	Failed	DOR	Total
N	580	107	77	764

Shrunken Multiple R with Pass/Fail				Shrunken Multiple R with DOR			
Variable	Cum. R	Beta Weight	Variable	Cum. R	Beta Weight	Variable	Beta Weight
*Physiology	.270	.37	MCT	.241	.26		
*MCT	.315	.22	Math (1)	.304	.18		
Chins (1)	.335	.43	Chins (1)	.349	.74		
*SAT	.345	.21	BI	.356	.12		
*Jump Reach (1)	.354	.56	Jump Reach (1)	.360	-.33		
*Math (1)	.360	.06	SAT	.362	.13		
Step Test (1)	.362	.29	Physiology	.363	.07		
Sit-Ups (1)	.364	-.13					

Officer Matrix #4 - Week Six

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	FAIL	DOR	MEAN	S.D.
1. AQT	.371	.275	.035	.427	-.025	-.126	-.120	-.101	-.048	.213	.479	.334	.518	-.121	-.162	.112	.156	84.99	13.35
2. MCT	.285	.208	.238	.238	.008	-.080	-.051	.009	.018	.308	.360	.504	.350	.041	.065	.232	.241	61.28	7.68
3. SAT		.120	.124	.124	-.036	-.033	.033	.005	.070	.107	.128	.133	.206	.060	.021	.174	.140	20.04	6.04
4. BI				-.089	.064	.024	.061	.145	.008	.106	.086	.175	.079	.162	.132	.112	.124	31.88	8.59
5. Math (I)					-.126	-.078	-.059	-.059	-.005	-.028	.409	.083	.400	-.162	-.135	.085	.236	40.20	16.52
6. Jump Reach (I)						.225	.492	.212	.186	-.027	-.048	-.024	-.035	.334	.313	.115	-.041	11.01	2.46
7. Sit-Ups (I)							.369	.454	.341	.005	-.063	-.065	-.121	.301	.382	.021	.044	10.27	6.12
8. Speed Agility (I)								.433	.410	-.039	-.076	-.075	-.073	.452	.495	.098	.026	10.79	4.27
9. Chins (I)									.354	.069	.010	.052	-.052	.382	.581	.125	.176	6.49	3.31
10. Step Test (I)										-.019	-.008	-.020	-.056	.236	.319	.092	.076	5.61	3.31
11. Physiology											.349	.542	.290	.097	.066	.275	.118	52.47	8.34
12. Aerodynamics												.568	.651	-.027	-.027	.291	.298	52.93	9.35
13. Engineering													.508	.024	.080	.326	.274	52.46	8.38
14. Navigation														-.044	-.070	.301	.187	53.86	6.65
15. Trampoline															.612	.164	.122	30.34	6.02
16. Gymnastics																.259	.179	31.49	6.97

	Completed	Failed	DOR	Total
N	564	100	77	741

Shrunken Multiple R with Pass/Fail Shrunken Multiple R with DOR

Variable	Cum. R	Beta Weight	Variable	Cum. R	Beta Weight
Engineering	.325	.10	Aerodynamics	.298	.13
Navigation	.358	.18	Chins (I)	.343	.37
Speed Agility	.378	.06	MCT	.369	.06
SAT	.390	.14	Math (I)	.387	.07
Physiology	.403	.10	Engineering	.398	.15
Jump Reach (I)	.410	.29	SAT	.401	.08
AQT	.419	-.07	BI	.403	.05
Chins (I)	.422	.14	Navigation	.409	-.11
Aerodynamics	.426	.08	Jump Reach (I)	.410	-.14
MCT	.427	.05	Physiology	.411	-.05

Officer Matrix #5 - Pre-Solo prior to Hop #9

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	FAIL	DOR	MEAN	S.D.
1. AQT	.370	.274	.037	.427	-.026	-.126	-.121	-.100	-.049	.213	.479	.334	.519	-.124	-.164	-.050	-.080	-.133	-.095	-.009	.109	.153	94.97	13.35
2. MCT	.285	.209	.122	.238	.007	-.081	-.053	.009	.017	.307	.360	.504	.350	.039	.064	-.013	-.030	-.100	.030	-.011	.228	.236	61.27	7.69
3. SAT				.123	-.037	-.034	.032	.005	.069	.107	.128	.133	.206	.059	.020	-.012	-.022	-.006	.009	-.026	.171	.138	20.03	6.04
4. BI				-.087	.066	.025	.063	.145	.010	.161	.086	.175	.079	.166	.134	.049	.028	.042	.120	-.054	.113	.125	31.90	8.59
5. Math (I)					-.127	-.081	-.063	-.060	-.007	-.029	.409	.083	.400	-.166	-.138	-.147	-.078	-.082	-.076	-.031	.083	.234	46.16	16.52
6. Jump Reach (I)						.225	.493	.213	.186	-.028	-.048	-.024	-.035	.333	.313	.810	.116	.503	.237	.090	.111	-.043	11.00	2.47
7. Sit-Ups (I)							.367	.453	.341	.003	-.063	-.066	-.124	.300	.381	.191	.678	.310	.434	.109	.019	.042	10.26	6.12
8. Speed Agility (I)								.432	.409	-.041	-.076	-.076	-.075	.450	.494	.462	.205	.736	.433	.162	.075	.024	10.78	4.26
9. Chins (I)									.354	.069	.011	.052	-.054	.383	.581	.198	.272	.399	.876	.095	.124	.175	6.49	3.31
10. Step Test (I)										-.021	-.008	-.001	-.057	.234	.318	.146	.178	.322	.347	.195	.091	.075	5.61	3.31
11. Physiology											.350	.542	.290	.095	.065	-.012	.026	-.055	.061	.020	.272	.115	52.46	8.35
12. Aerodynamics												.568	.652	-.028	-.027	-.068	-.011	-.120	-.002	.013	.289	.294	52.93	8.35
13. Engineering													.508	.024	-.071	-.062	-.004	-.091	-.062	.023	.323	.271	52.46	8.39
14. Navigation														-.045	.611	.333	.254	.450	.379	.117	.296	.184	53.86	6.65
15. Trampoline																.323	.297	.506	.589	.093	.161	.119	30.32	6.02
16. Gymnastics																	.127	.492	.253	.058	.257	.177	31.48	6.98
17. Jump Reach (O)																		.182	.301	.106	.077	-.021	11.37	2.43
18. Sit-Ups (O)																			.389	.146	.084	.067	15.51	5.03
19. Speed Agility (O)																				.146	.136	.073	12.33	4.10
20. Chins (O)																				.115	.152	.170	8.77	3.70
21. Step Test (O)																					-.004	-.055	7.79	1.19

Completed	Failed	DOR	Total
562	100	77	739

Shrunken Multiple R with Pass/Fail				Shrunken Multiple R with DOR			
Variable	Cum. R	Beta Weight	Variable	Cum. R	Beta Weight	Variable	Beta Weight
* Engineering	.322	.14	Aerodynamics	.293	.19		
* Chins (I)	.348	.32	Chins	.338	.56		
* Navigation	.385	.23	MCT	.363	.08		
* SAT	.397	.21	Math (I)	.382	.12		
* Jump Reach (I)	.407	.44	Engineering	.394	.24		
* Physiology	.419	.15	BI	.398	.09		
* AQT	.426	-.10	SAT	.400	.12		
* Aerodynamics	.431	.12	Navigation	.406	-.17		
* MCT	.432	.07	Jump Reach (I)	.406	-.22		
			Physiology	.407	-.07		

Officer Matrix #6 - Pre-Solo Hop #9 and after and Precision

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	FAIL	DOR	MEAN	S.D.
1. AQT	.365	.276	.027	.429	-.023	-.137	-.123	-.096	-.053	.198	.486	.325	.525	-.136	-.168	-.046	-.093	-.140	-.094	.005	.087	.109	.167	84.96	13.36
2. MCT		.278	.198	.241	.003	-.086	-.069	.006	.014	.300	.354	.494	.351	.020	.054	-.021	-.037	-.110	.021	-.005	.197	.216	.250	61.30	7.72
3. SAT			.122	.119	-.043	-.042	.018	-.010	.057	.125	.136	.141	.209	.049	.003	-.019	-.027	-.014	-.006	-.017	.185	.196	.200	19.95	6.05
4. BI				-.077	.061	.024	.050	.129	.013	.156	.083	.161	.072	.155	.122	.035	.030	.038	.098	-.049	.238	.065	.109	32.02	8.62
5. Math (I)					-.125	-.076	-.059	-.047	-.010	-.027	.429	.091	.407	-.163	-.134	-.145	-.075	-.080	-.062	-.024	.110	.114	.382	45.86	16.81
6. Jump Reach (I)						.221	.486	.205	.196	-.007	-.037	-.019	-.028	.338	.301	.809	.114	.497	.228	.099	.083	.125	-.070	10.99	2.47
7. Sit-Ups (I)							.368	.449	.350	-.004	-.067	-.079	-.132	.293	.374	.189	.675	.302	.434	.099	.054	.026	-.023	10.29	6.14
8. Speed Agility (I)								.418	.410	-.038	-.087	-.096	-.081	.434	.476	.453	.200	.732	.418	.155	.120	.070	-.031	10.82	4.25
9. Chins (I)									.353	-.065	.004	.039	.056	.371	.581	.187	.264	.390	.874	.065	.093	.087	-.132	6.55	3.31
10. Step Test (I)										-.011	-.034	-.026	.062	.234	.329	.152	.189	.322	.350	.190	.090	.103	.065	5.63	3.30
11. Physiology											.334	.535	.281	.080	.065	.001	.025	-.063	.056	.015	.147	.246	.039	52.63	8.18
12. Aerodynamics												.553	.650	-.040	-.033	-.059	-.022	-.131	-.008	.018	.152	.254	.290	53.17	9.24
13. Engineering													.540	-.005	.064	.025	.007	-.094	.026	.032	.203	.278	.156	52.78	8.06
14. Navigation														-.062	-.076	-.059	-.019	-.094	-.064	.010	.135	.272	.206	53.91	6.68
15. Trampoline															.602	.325	.248	.440	.364	.104	.159	.126	.075	30.44	6.02
16. Gymnastics																.302	.294	.496	.587	.084	.165	.248	-.150	31.58	6.90
17. Jump Reach (O)																	.128	.488	.242	.056	.054	.082	-.043	11.36	2.42
18. Sit-Ups (O)																		.171	.383	.095	.062	.078	-.018	15.56	5.01
19. Speed Agility (O)																				.136	.138	.112	-.022	12.39	4.05
20. Chins (O)																				.104	.080	.112	.108	8.84	3.69
21. Step Test (O)																					.012	.008	.092	7.79	1.17
22. Pre-Solo																						.436	.172	295.48	10.57

Shrunken Multiple R with Pass/Fail Shrunken Multiple R with DOR

Variable	Cum. R	Beta Weight	Variable	Cum. R	Beta Weight
* Pre-Solo	.436	.38	Math (I)	.382	.20
* Navigation	.484	.27	MCT	.413	.15
* Physiology	.500	.16	Chins (I)	.437	.57
* Jump Reach (I)	.509	.46	SAT	.451	.23
Chins (O)	.514	.54	Aerodynamics	.459	.16
* SAT	.519	.17	AQT	.466	-.09
* BI	.523	-.11	BI	.470	.08
* AQT	.526	-.09	Speed Agility (I)	.474	-.19
* Aerodynamics	.528	.09	Pre-Solo	.476	.07
* MCT	.529	.06	Physiology	.478	-.08
Speed Agility (I)	.530	-.10	Sit-Ups	.479	-.08
Chins (I)	.531	-.37			

Officer Matrix #7 - Transition

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	FAIL	DOR	MEAN	S.D.
1. AGT	.382	.283	.037	.433	-.013	-.157	-.139	-.102	-.083	.189	.490	.326	.536	-.128	-.169	-.036	-.092	-.158	-.096	-.093	.096	.094	.152	.135	85.08	13.40
2. MCT	.201	.270	.201	.241	.000	-.078	-.079	-.008	.017	.312	.369	.503	.353	.001	.051	-.016	-.033	-.124	.008	-.072	.199	.202	.233	.225	61.48	7.73
3. SAT	.128	.128	.128	.125	-.036	-.038	.013	-.027	.049	.150	.157	.160	.218	.041	-.003	.014	-.009	-.027	-.027	-.025	.188	.155	.195	.212	20.06	6.06
4. BI				-.091	.068	.024	.063	.138	.024	.167	.081	.173	.082	.150	.128	.048	.045	.053	.109	-.045	.237	.156	.044	.083	32.17	8.62
5. Math (I)					-.131	-.103	-.069	-.060	-.025	-.032	.435	.094	.404	-.178	-.151	-.150	-.096	-.098	-.075	-.027	.097	.090	.082	.314	46.51	16.66
6. Jump Reach (I)						.729	.500	.211	.205	-.011	-.035	-.024	-.041	.342	.308	.809	.114	.508	.230	.105	.065	.073	.099	-.121	11.02	2.48
7. Sit-Ups (I)							.373	.463	.412	-.015	-.092	-.088	-.149	.315	.395	.204	.677	.311	.448	.087	.038	.036	-.045	-.069	10.41	6.16
8. Speed Agility (I)								.418	.348	.074	.008	.037	.053	.364	.575	.197	.282	.380	.869	.066	.055	.070	.003	.040	6.97	3.31
9. Chins (I)										-.025	-.020	-.040	-.065	.249	.319	.160	.194	.315	.343	.200	.050	.044	-.015	.023	5.74	3.27
10. Step Test (I)											.342	.556	.544	.291	.090	.071	.006	.023	.056	.067	.027	.161	.167	.023	5.74	3.27
11. Physiology																								.055	52.63	8.17
12. Aerodynamics																								.304	53.37	9.12
13. Engineering																								.172	52.90	8.02
14. Navigation																								.294	54.06	6.66
15. Trampoline																								.017	30.62	6.05
16. Gymnastics																								.074	31.84	6.71
17. Jump Reach (O)																								-.054	11.37	2.42
18. Sit-Ups (O)																								.014	15.64	4.96
19. Speed Agility (O)																								-.073	12.46	4.08
20. Chins (O)																								.031	8.99	3.66
21. Step Test (O)																								-.092	7.81	1.12
22. Pre-Solo																								.307	296.22	10.02
23. Precision																								.491	298.84	9.02

Shrunken Multiple R with Pass/Fail

Variable	Cum. R	Beta Weight
* Precision	.491	.42
* Physiology	.535	.19
* Navigation	.554	.15
* Jump Reach (I)	.559	.36
* SAT	.562	.14
* BI	.567	-.09
* Sit-Ups (I)	.568	-.08
* Aerodynamics	.570	.08
AGT	.571	-.03

Shrunken Multiple R with DOR

Variable	Cum. R	Beta Weight
Math (I)	.314	.13
SAT	.357	.23
Aerodynamics	.392	.25
Precision	.407	.12
Jump Reach (I)	.415	-.35
AGT	.426	-.08
MCT	.432	.11
Navigation	.437	-.14
Chins (I)	.439	-.21
Sit-Ups (I)	.441	-.09
Physiology	.443	-.07
BI	.444	.05

Officer Matrix #8 - After Transition

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	FAIL	DOR	MEAN	S.D.	
1. AQT	.362	.272	.026	.419	-.007	-.187	-.156	-.124	-.105	.168	.494	.313	.529	-.149	-.189	-.051	-.126	-.171	-.117	-.002	.081	.084	.101	.127	.149	85.10	13.43	
2. MCT		.250	.179	.236	.000	-.092	-.106	-.033	-.026	.299	.350	.484	.352	-.031	.040	-.041	-.051	-.132	-.023	-.028	.187	.201	.188	.229	-.197	61.32	7.69	
3. SAT			.099	-.119	-.028	-.052	-.014	.044	.020	.131	.145	.128	.224	.021	-.030	-.025	-.022	-.048	-.052	.031	.168	.138	.162	.186	.227	19.92	6.06	
4. BI				-.104	.056	.009	.041	.115	-.007	.146	.038	.133	.059	.118	.106	.031	.024	.043	.078	.056	.195	.131	.124	.009	-.047	31.84	8.49	
5. Meth (I)					-.123	-.118	-.075	-.042	-.045	.434	.079	.387	.387	.180	-.166	.159	-.107	.112	.098	-.028	.057	.036	-.008	.064	-.307	46.65	16.59	
6. Jump Reach (I)						.228	.480	.229	.203	-.023	-.016	-.016	-.049	.328	.307	.807	.128	.503	.242	.108	.052	.065	.169	.079	-.036	10.95	2.44	
7. Sit-Ups (I)							.381	.457	.371	-.022	-.097	-.107	.170	.297	.400	.188	.669	.317	.436	.088	.027	.016	.055	.000	-.015	10.28	6.19	
8. Speed Agility (I)								.454	.359	-.060	-.088	-.119	-.107	.436	.480	.457	.229	.725	.439	.159	.093	.039	.169	-.079	-.058	10.74	4.20	
9. Chins (I)									.359	-.051	-.039	-.073	-.076	.240	.319	.144	.200	.316	.345	.206	.003	-.025	.024	-.080	.092	6.59	3.28	
10. Step Test (I)											-.348	.545	.282	.080	.068	.009	.009	.052	.077	.027	.141	.153	.166	.285	-.002	52.56	8.20	
11. Physiology												.536	.507	.049	-.044	-.044	-.041	-.131	-.031	-.021	.133	.157	.166	.250	.174	53.39	8.93	
12. Aerodynamics														-.081	.049	-.027	-.003	.104	.007	.006	.182	.187	.200	.325	.080	52.74	8.05	
13. Engineering																.303	.247	.456	.342	.099	.140	.129	.163	.265	.161	54.05	6.55	
14. Navigation																.582	.317	.311	.570	.063	.130	.151	.172	.199	.086	30.34	5.98	
15. Trampoline																	.140	.497	.242	.055	.012	.053	.188	.050	.022	11.31	2.41	
16. Gymnastics																		.206	.298	.085	.032	.004	.036	.041	.041	15.52	4.98	
17. Jump Reach (O)																			.401	.128	.115	.097	.171	-.006	.108	12.48	4.01	
18. Sit-Ups (O)																				.084	.011	.020	.120	.076	-.090	8.86	3.65	
19. Speed Agility (O)																					-.016	-.063	.023	-.093	-.083	7.78	1.19	
20. Chins (O)																						.517	.379	.258	.164	295.95	9.71	
21. Step Test (O)																							.403	.527	.203	296.43	11.39	
22. Pre-Solo																												
23. Precision																												
24. Transition																												

Shrunken Multiple R with Pass/Fail

Variable	Cum. R	Beta Weight
*Transition	.527	.40
*Engineering	.571	.18
*Precision	.608	.32
Speed Agility (I)	.618	-.49
*BI	.625	-.15
*Physiology	.631	.14
Chins (I)	.635	.27
*SAT	.638	.14
*Jump Reach (I)	.640	.34

Shrunken Multiple R with DOR

Variable	Cum. R	Beta Weight
Meth (I)	.306	.19
Transition	.366	.14
SAT	.398	.29
Speed Agility (I)	.402	.15
MCT	.407	.12
Physiology	.409	-.09
Pre-Solo	.410	.07
Chins (O)	.411	.16

APPENDIX C

Non-Officer Matrices, Multiple Correlations, and Beta Weights--

Complete/Attrite Criterion

Non-Officer Matrix #1A - Weeks 1 and 2

	2	3	4	5	6	Comp./ Attrite	MEAN	S.D.
1. AQT	.282	.169	-.017	.088	.518	.092	76.30	13.20
2. MCT		.088	.030	-.069	.333	.163	60.89	7.12
3. SAT			-.070	.104	.099	.150	20.45	5.51
4. BI				-.066	-.051	.111	33.06	8.26
5. Education					.080	.012	6.75	1.20
6. Math (I)						.102	14.49	9.51

	Completed	Attrited	Total
N	498	325	823

Shrunken Multiple R (Point-biserial) with Complete/Attrite

Variable	Cum. R	Beta Weights
MCT	.160	2.06
SAT	.206	2.62
BI	.233 (R_b equivalent .295)	1.40

Constant to be added to predicted scores = 274.42

Non-Officer Matrix #2A ~ Weeks 3, 4, and 5

	2	3	4	5	6	7	Comp./ Attrite	MEAN	S.D.
1. AQT	.282	.169	-.017	.088	.518	-.018	.092	76.30	13.20
2. MCT		.088	.030	-.069	.333	-.051	.163	60.89	7.12
3. SAT			-.070	.104	.099	.030	.150	20.45	5.51
4. BI				-.066	-.051	.041	.111	33.06	8.26
5. Education					.080	.012	.012	6.75	1.20
6. Math (I)						.068	.102	14.27	9.50
7. Jump Reach (I)							.069	11.01	2.77

	Completed	Attrited	Total
N	498	325	823

Shrunken Multiple R (Point Biserial) with Complete/Attrite

Variable	Cum. R	Beta Weights
MCT	.160	2.11
SAT	.206	2.58
BI	.233	1.37
Jump Reach (I)	.239 (R_b equivalent .303)	2.42

Constant to be added to predicted scores = 246.73

Non-Officer Matrix #3A - Weeks 6, 7, and 8

	2	3	4	5	6	7	8	Comp./ Attrite	MEAN	S.D.
1. AQT	.279	.168	-.019	.089	.515	-.017	.532	.095	76.27	13.19
2. MCT		.086	.027	-.067	.329	-.050	.297	.166	60.87	7.11
3. SAT			-.072	.105	.097	.031	.166	.152	20.44	5.51
4. BI				-.065	-.055	.042	-.111	.113	33.04	8.26
5. Education					.082	.012	.024	.011	6.75	1.20
6. Math (I)						.070	.712	.106	14.25	9.47
7. Jump Reach (I)							.068	.068	11.01	2.77
8. Math (F)								.154	47.26	10.18

	Completed	Attrited	Total
N	497	325	822

Shrunken Multiple R (Point-biserial) with Complete/Attrite

Variable	Cum. R	Beta Weights
MCT	.167	1.72
SAT	.214	2.37
BI	.242	1.55
Math (F)	.261	1.05
Jump Reach (I)	.265 (R_b equivalent)	2.06

Constant to be added to predicted scores = 223.28

Non-Officer Matrix #4A - Weeks 9 and 10

	2	3	4	5	6	7	8	9	10	11	Comp./ Attrite	MEAN	S.D.
1. AQT	.283	.160	-.018	.094	.510	-.013	.536	.113	.538	-.047	.092	76.76	13.27
2. MCT		.106	.014	-.053	.328	-.056	.310	.082	.459	.031	.138	61.08	7.03
3. SAT			-.062	.106	.095	.029	.159	.104	.113	.001	.145	20.50	5.49
4. BI				-.064	-.044	.050	-.099	.110	-.061	.102	.113	32.97	8.14
5. Education					.077	.006	.010	-.053	.084	.037	.019	6.76	1.22
6. Math (I)						.058	.701	.135	.587	-.024	.092	14.89	9.47
7. Jump Reach (I)							.043	.123	-.031	.277	.067	11.01	2.76
8. Math (F)								.198	.612	.054	.126	48.09	9.68
9. Peer Rating									.122	.220	.195	49.97	10.76
10. Physics										.031	.138	47.83	9.72
11. Trampoline											.128	29.97	5.99

	Completed	Attrited	Total
N	466	276	742

Shrunken Multiple R (Point-biserial) with Complete/Attrite

Variable	Cum. R	Beta Weights
Peer Rating	.195	1.29
SAT	.229	2.17
MCT	.251	1.05
BI	.268	1.23
Trampoline	.277	1.36
Physics	.282 (R_b equivalent .360)	.78

Constant to be added to predicted scores = 208.24

Non-Officer Matrix #5A - Weeks 11, 12, and 13

	2	3	4	5	6	7	8	9	10	11	12	Comp./ Attrite	MEAN	S.D.
1. AQT	.283	.160	-.018	.084	.510	-.013	.536	.113	.538	-.047	.420	.082	76.76	13.27
2. MCT		.106	.013	-.053	.328	-.056	.310	.082	.459	.031	.274	.138	61.08	7.03
3. SAT			-.062	.106	.095	.029	.159	.104	.113	.001	.170	.145	20.50	5.49
4. BI				-.064	-.044	.050	-.099	.110	-.061	.102	-.049	.113	32.97	8.14
5. Education					.077	.006	.010	-.053	.084	.037	.086	.019	6.76	1.22
6. Math (I)						.058	.701	.135	.587	-.024	.376	.082	14.89	9.47
7. Jump Reach (I)							.043	.123	-.031	.277	.033	.067	11.01	2.76
8. Math (F)								.198	.612	.054	.473	.126	48.09	9.68
9. Peer Rating									.122	.220	.245	.195	49.97	10.76
10. Physics										.031	.454	.138	47.83	9.72
11. Trampoline											.038	.128	29.97	5.99
12. Navigation												.194	48.62	6.84

	Completed	Attrited	Total
N	466	276	742

Shrunken Multiple R (Point-biserial) with Complete/Attrite

Variable	Cum. R	Beta Weights
Peer Rating	.195	1.08
Navigation	.244	1.84
BI	.263	1.28
SAT	.283	1.99
Trampoline	.293	1.40
MCT	.301 (R_b equivalent .384)	1.11

Constant to be added to predicted scores = 163.60

Non-Officer Matrix #6A - Weeks 14, 15, 16 and Pre-Solo prior to Hop #9

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Comp./ Attrite	MEAN	S.D.
1. AQT	.278	.159	-.017	.086	.508	-.014	.534	.112	.535	-.050	.417	.273	.601	.254	.078	76.80	13.26
2. MCT		.102	.015	-.051	.323	-.057	.300	.082	.453	.026	.268	.399	.440	.252	.132	61.12	6.99
3. SAT			-.062	.105	.092	.029	.154	.105	.111	.000	.169	.043	.143	.050	.143	20.52	5.49
4. BI				-.065	-.044	.050	-.099	.110	-.060	.102	-.049	.049	-.079	.061	.114	32.97	8.15
5. Education					.078	.007	.010	-.052	.086	.037	.088	.218	.080	.245	.020	6.76	1.22
6. Math (I)						.058	.699	.135	.584	-.027	.373	.228	.701	.142	.078	14.92	9.46
7. Jump Reach (I)							.044	.122	-.031	.278	.032	-.036	.009	-.009	.068	11.01	2.77
8. Math (F)								.198	.608	.049	.470	.232	.856	.125	.119	48.14	9.62
9. Peer Rating									.121	.220	.245	.116	.177	.102	.195	49.98	10.78
10. Physics										.027	.450	.515	.923	.312	.132	47.88	9.69
11. Trampoline											.035	.028	.049	.078	.125	29.98	5.99
12. Navigation												.416	.520	.248	.190	48.65	6.84
13. Engineering													.461	.412	.212	49.72	8.36
14. Aerodynamics														.343	.147	48.59	8.06
15. Physiology															.121	53.34	7.64

	Completed	Attrited	Total
N	465	275	740

Shrunken Multiple R (Point-biserial) with Complete/Attrite

Variable	Cum. R	Beta Weight
Engineering	.212	1.83
Peer Rating	.269	1.08
SAT	.292	2.10
BI	.305	1.17
Trampoline	.313	1.38
Navigation	.319 (R_b equivalent)	1.17

Constant to be added to predicted scores = 174.69

Non-Officer Matrix #7A - Pre-Solo Hop #9 and after and Precision

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Comp./ Attrite	MEAN	S.D.
1. AGT	.273	.164	-.014	.103	.494	-.033	.528	.112	.538	-.069	.395	.273	.601	.261	-.046	.083	76.87	13.29
2. MCT		.100	.026	-.039	.343	-.054	.317	.067	.448	.000	.251	.388	.444	.241	.106	.100	61.37	6.93
3. SAT			-.046	.109	.114	.007	.168	.065	.116	-.015	.171	.024	.153	.049	.105	.127	20.66	5.46
4. BI				-.061	-.022	.049	-.092	.128	-.042	.086	-.040	.048	-.062	.076	.202	.105	33.13	8.14
5. Education					.095	-.013	.010	-.058	.093	.014	.088	.213	.083	.253	-.009	.033	6.75	1.23
6. Math (I)						.057	.694	.130	.581	-.044	.368	.247	.697	.149	-.014	.094	14.91	9.48
7. Jump Reach (I)							.032	.077	-.047	.247	.006	-.057	-.005	-.011	.008	.038	11.09	2.76
8. Math (F)								.189	.614	.034	.463	.242	.861	.134	.005	.132	48.19	9.65
9. Peer Rating									.112	.179	.231	.113	.169	.117	.125	.178	50.37	10.44
10. Physics										.003	.436	.516	.922	.294	-.031	.108	48.18	9.63
11. Trampoline											.010	-.013	.028	.081	.022	.086	30.22	6.00
12. Navigation												.403	.507	.238	.164	.169	48.90	6.73
13. Engineering													.463	.402	.128	.159	50.24	8.12
14. Aerodynamics														.335	-.012	.137	48.77	8.04
15. Physiology															.055	.116	53.48	7.52
16. Pre-Solo																.289	293.99	11.34

	Completed	Attrited	Total
N	465	201	666

Shrunken Multiple R (Point-biserial) with Complete/Attrite

Variable	Cum. R	Beta Weights
Pre-Solo	.290	2.19
Peer Rating	.320	1.00
Aerodynamics	.338	.89
SAT	.343	1.54
Engineering	.348	.95
Trampoline	.352	.99
BI	.353 (R_b equivalent .465)	.50

Constant to be added to predicted scores = 364.71

Non-Officer Matrix #8A - Transition

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Attrite	MEAN	S.D.
1. AGT	.282	.158	-.011	.099	.496	-.038	.527	.111	.529	-.071	.400	.278	.595	.258	-.044	.047	.078	77.00	13.46
2. MCT		.101	.035	-.034	.332	-.043	.311	.040	.466	.002	.252	.408	.454	.261	.065	.143	.062	61.59	6.91
3. SAT			-.038	.109	.109	.015	.160	.067	.103	-.009	.165	.013	.141	.041	.106	.171	.113	20.77	5.51
4. BI				-.066	-.018	.060	-.086	.134	-.036	.060	-.042	.045	-.057	.063	.222	.185	.092	33.26	8.12
5. Education					.102	-.012	.006	-.059	.076	.007	.088	.186	.071	.255	-.018	-.039	.033	6.76	1.21
6. Math (I)						.065	.690	.112	.585	-.031	.364	.248	.697	.147	-.049	.020	.071	15.11	9.55
7. Jump Reach (I)							.035	.091	0.053	.241	.006	-.058	-.007	-.011	.030	.004	.054	11.07	2.79
8. Math (F)								.163	.615	.049	.449	.240	.861	.126	-.029	.034	.115	48.40	9.63
9. Peer Rating									.108	.181	.201	.104	.151	.095	.079	.110	.162	50.64	10.36
10. Physics										.000	.441	.516	.923	.291	-.027	.062	.104	48.30	9.67
11. Trampoline											-.004	-.024	.031	.068	.010	.075	.088	30.26	6.02
12. Navigation												.411	.503	.232	.137	.166	.154	49.06	6.73
13. Engineering													.463	.413	.113	.146	.144	50.42	8.16
14. Aerodynamics														.328	-.027	.065	.128	48.92	8.06
15. Physiology																.124	.121	53.55	7.42
16. Pre-Solo																.551	.198	294.95	10.71
17. Precision																	.247	297.29	9.07

	Complete	Attrite	Total
N	465	149	614

Shrunken Multiple R (Point-biserial) with Complete/Attrite

Variable	Cum. R	Beta Weights
Precision	.247	1.75
Peer Rating	.278	.96
Engineering	.291	.98
SAT	.297	1.11
Pre-Solo	.301	.84
Math (F)	.306	.74
Trampoline	.308	.88
Physiology	.309	.68
MCT	.310 (R_b equivalent .424)	-.65

Constant to be added to predicted scores = 445.96

Non-Officer Matrix #9A - After Transition

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Comp./ Attrite	MEAN	S.D.
1. AQT	.278	.161	-.004	.090	.486	-.040	.513	.109	.520	-.069	.392	.260	.582	.248	-.038	.027	.043	.090	77.01	13.53
2. MCT	.109	.030	-.030	-.029	.333	-.043	.309	.033	.467	.000	.258	.402	.454	.257	.064	.147	.034	.062	61.62	7.01
3. SAT		-.041		.117	.115	.033	.165	.073	.110	-.004	.179	.016	.147	.035	.105	.179	.170	.122	20.79	5.55
4. BI				-.068	-.012	.081	-.084	.115	-.049	.058	-.060	.038	-.060	.050	.222	.171	.169	.062	33.45	8.12
5. Education					.094	.002	.001	-.058	.079	.012	.093	.190	.072	.265	-.002	-.029	.008	.036	6.76	1.22
6. Math (I)						.047	.686	.125	.587	-.018	.366	.233	.694	.143	-.037	.021	.010	.101	15.03	9.48
7. Jump Reach (I)							.019	.138	-.037	.291	-.006	-.029	-.013	.016	.052	.034	-.001	.115	11.02	2.54
8. Math (F)								.167	.614	.062	.441	.225	.859	.121	-.018	.034	.098	.150	48.34	9.63
9. Peer Rating									.100	.183	.183	.091	.149	.077	.062	.077	.119	.154	50.83	10.35
10. Physics										.000	.439	.509	.924	.288	-.022	.037	.040	.105	48.38	9.71
11. Trampoline											-.004	-.024	.037	.057	.003	.067	.003	.081	30.32	6.08
12. Navigation												.411	.498	.230	.128	.150	.153	.162	49.13	6.71
13. Engineering													.454	.418	.110	.142	.130	.124	50.60	8.18
14. Aerodynamics														.324	-.021	.048	.079	.144	48.94	8.07
15. Physiology															.025	.089	.098	.086	53.75	7.38
16. Pre-Solo																.556	.425	.175	295.24	10.80
17. Precision																	.413	.177	297.82	8.72
18. Transition																		.271	294.68	11.18

	Complete	Attrite	Total
N	465	107	572

Shrunken Multiple R (Point-biserial) with Complete/Attrite

Variable	Cum. R	Beta Weights
Transition	.270	1.86
Math (F)	.294	.93
Jump Reach (I)	.312	3.88
Peer Rating	.322	.83
Engineering	.326	.79
SAT	.328	.99
Pre-Solo	.331 (R_b equivalent .480)	.58

Constant to be added to predicted scores = 409.93

APPENDIX D

Officer Matrices, Multiple Correlations, and Beta Weights--
Complete/Attrite Criterion

Officer Matrix #1A - Weeks 1 and 2

	2	3	4	5	Comp./ Attrite	MEAN	S.D.
1. AQT	.363	.262	.028	.420	.097	84.85	13.42
2. MCT		.258	.190	.237	.168	60.93	7.87
3. SAT			.111	.118	.085	19.88	6.03
4. BI				-.102	.059	31.52	8.43
5. Math (I)					.133	46.27	16.46

	Completed	Attrited	Total
N	532	217	749

Shrunken Multiple R (Point-biserial) with Complete/Attrite

Variable	Cum. R	Beta Weights
MCT	.167	1.72
Math (I)	.189	.63
BI	.191 (R_b equivalent .253)	.51

Constant to be added to predicted scores = 350.07

Officer Matrix #2A - Weeks 3, 4 and 5

	2	3	4	5	6	7	Comp./ Attrite	MEAN	S.D.
1. AQT	.361	.262	.027	.419	-.026	.214	.096	84.82	13.41
2. MCT		.257	.189	.236	.008	.292	.167	60.92	7.86
3. SAT			.110	.118	-.032	.084	.084	19.87	6.03
4. BI				-.103	.051	.137	.059	31.51	8.43
5. Math (I)					-.126	-.028	.133	46.26	16.47
6. Jump Reach (I)						-.027	.017	10.95	2.44
7. Physiology							.130	52.25	8.35

	Completed	Attrited	Total
N	531	217	748

Shrunken Multiple R (Point biserial) with Complete/Attrite

Variable	Cum. R	Beta Weights
MCT	.167	1.43
Math (I)	.189	.66
Physiology	.208 (R _b equivalent .275)	1.19

Constant to be added to predicted scores = 320.45

Officer Matrix #3A - Week 6 and Pre-Solo prior to Hop #9

	2	3	4	5	6	7	8	9	10	11	Comp./ Attrite	MEAN	S.D.
1. AQT	.366	.270	.033	.418	-.025	.205	.473	.329	.512	-.129	.083	84.78	13.43
2. MCT		.272	.195	.243	-.003	.292	.352	.495	.346	.020	.157	60.99	7.72
3. SAT			.106	.119	-.035	.089	.115	.113	.200	.054	.093	19.84	6.03
4. BI				-.099	.047	.140	.062	.151	.062	.139	.066	31.54	8.49
5. Math (I)					-.127	-.038	.413	.081	.393	-.163	.136	46.15	16.49
6. Jump Reach (I)						-.021	-.058	-.029	-.043	.333	.016	10.96	2.43
7. Physiology							.346	.537	.280	.086	.134	52.25	8.35
8. Aerodynamics								.561	.639	-.054	.223	52.63	9.32
9. Engineering									.497	.005	.210	52.16	8.39
10. Navigation										-.065	.178	53.69	6.66
11. Trampoline											.088	30.11	5.96

	Completed	Attrited	Total
N	522	203	725

Shrunken Multiple R (Point biserial) with Complete/Attrite

Variable	Cum. R	Beta Weights
Aerodynamics	.220	1.44
Engineering	.239	1.77
Math (I)	.247	.62
SAT	.250	1.19
AQT	.258	-.67
Jump Reach (I)	.259 (R _b equivalent)	1.69

Constant to be added to predicted scores = 317.88

Officer Matrix #4A - Pre-Solo Hop #9 and After and Precision

	2	3	4	5	6	7	8	9	10	11	12	Comp./ Attrite	MEAN	S.D.
1. AQT	.355	.271	.022	.422	-.022	.191	.481	.316	.516	-.139	.089	.089	84.81	13.41
2. MCT		.265	.189	.244	-.002	.283	.344	.485	.342	.005	.193	.157	61.07	7.73
3. SAT			.104	.116	-.038	.110	.120	.118	.202	.049	.184	.124	19.77	6.05
4. BI				-.094	.046	.133	.059	.139	.056	.128	.204	.047	31.67	8.51
5. Math (I)					-.130	-.034	.432	.087	.401	-.162	.097	.185	45.81	16.79
6. Jump Reach (I)						-.001	-.046	-.021	-.037	.342	.069	.022	10.96	2.45
7. Physiology							.331	.528	.273	.071	.134	.108	52.46	8.17
8. Aerodynamics								.545	.639	-.064	.130	.203	52.89	9.18
9. Engineering									.492	-.021	.188	.166	52.52	8.05
10. Navigation										-.076	.122	.178	53.77	6.68
11. Trampoline											.144	.061	30.24	5.97
12. Pre-Solo												.256	294.97	10.19

	Completed	Attrited	Total
N	520	164	684

Shrunken Multiple R (Point biserial) with Complete/Attrite

Variable	Cum. R	Beta Weights
Pre-Solo	.254	2.06
Aerodynamics	.303	1.17
Math (I)	.316	.81
SAT	.319	1.16
AQT	.321	-.60
Engineering	.324 (R_b equivalent .444)	.89

Constant to be added to predicted scores = 224.54

Officer Matrix #5A - Transition

	2	3	4	5	6	7	8	9	10	11	12	13	Comp./ Attrite	MEAN	S.D.
1. AQT	.372	.279	.032	.427	-.012	.181	.485	.317	.527	-.130	.100	.092	.088	94.92	13.45
2. MCT		.257	.193	.245	-.006	.295	.360	.493	.344	-.013	.198	.199	.140	61.24	7.74
3. SAT			.110	.123	-.029	.136	.143	.138	.212	.042	.190	.153	.111	19.88	6.05
4. BI				-.109	.054	.143	.056	.152	.067	.122	.203	.130	.023	31.80	8.51
5. Math (I)					-.137	-.038	.440	.091	.398	-.177	.084	.066	.134	46.50	16.63
6. Jump Reach (I)						-.004	-.045	-.026	-.051	.346	.049	.070	.005	10.98	2.45
7. Physiology							.338	.538	.283	.081	.150	.161	.132	52.44	8.16
8. Aerodynamics								.549	.657	-.065	.154	.174	.200	53.08	9.06
9. Engineering									.505	-.033	.190	.174	.167	52.63	8.00
10. Navigation										-.085	.134	.198	.163	53.97	6.67
11. Trampoline											.124	.125	.011	30.41	6.01
12. Pre-Solo												.520	.159	295.71	9.60
13. Precision													.284	298.43	8.97

	Completed	Attrited	Total
N	520	117	637

Shrunken Multiple R (Point biserial) with Complete/Attrite

Variable	Cum. R	Beta Weights
Precision	.284	2.77
Aerodynamics	.320	1.07
SAT	.322	.87
Math (I)	.325	.53
Physiology	.326	.46
AQT	.327	-.43
Engineering	.328 (R _b equivalent .477)	.67

Constant to be added to predicted scores = 447.41

Officer Matrix #6A - After Transition

	2	3	4	5	6	7	8	9	10	11	12	13	14	Comp./ Attrite	MEAN	S.D.
1. AQT	.361	.274	.023	.418	-.005	.170	.491	.313	.527	-.142	.083	.082	.103	.072	85.10	13.44
2. MCT		.249	.117	.237	.000	.298	.351	.484	.353	-.029	.193	.205	.188	.132	61.35	7.68
3. SAT			.095	.118	-.027	.133	.144	.129	.224	.027	.177	.141	.165	.108	19.94	6.05
4. BI				-.107	.054	.144	.038	.133	.059	.115	.202	.137	.124	.015	31.84	8.49
5. Math (I)					-.120	-.043	.434	.080	.388	-.175	.065	.042	-.006	.122	46.76	16.58
6. Jump Reach (I)						-.023	-.016	-.016	-.049	.329	.050	.063	.169	.040	10.95	2.44
7. Physiology							.347	.545	.282	.083	.142	.152	.167	.123	52.56	8.19
8. Aerodynamics								.535	.652	-.051	.133	.157	.166	.151	53.40	8.92
9. Engineering									.507	-.035	.182	.186	.199	.168	52.73	8.03
10. Navigation										-.080	.114	.182	.192	.147	54.05	6.55
11. Trampoline											.135	.121	.163	.048	30.33	5.98
12. Pre-Solo												.510	.378	.142	295.90	9.58
13. Precision													.399	.229	298.86	8.32
14. Transition														.258	296.40	11.36

	Completed	Attrited	Total
N	517	84	601

Shrunken Multiple R (Point biserial) with Complete/Attrite

Variable	Cum. R	Beta Weights
Transition	.259	1.62
Precision	.290	1.53
Math (I)	.311	.76
Engineering	.323	1.36
AQT	.324	-.43
SAT	.324 (R_b equivalent .507)	.76

Constant to be added to predicted scores = 525.63

APPENDIX E

CNABATRA Instruction 1610.14A

HEADQUARTERS
NAVAL AIR BASIC TRAINING COMMAND
U. S. NAVAL AIR STATION
PENSACOLA, FLORIDA

CNABATRA 1610.14A
Code 108
26 August 1963

CNABATRA INSTRUCTION 1610.14A

From: Chief of Naval Air Basic Training
To: Distribution List

Subj: Improved Procedures for Predicting the Success or Failure of
Marginal Flight Students

Ref: (a) CNATRAININST 1610.5A
(b) CNATRA ltr Code 29 of 27 Jul 1962 (NOTAL)
(c) NAVSCOLAVMED ltr 362/asg, 3992/1 of 10 May 1963 (NOTAL)

Encl: (1) Predicting Student Success in Training, Graph - Tables
for Predicting Student Success

1. Purpose. This Instruction makes available to flight training administrators in the Naval Air Basic Training Command improved procedures which utilize an electronic computer in predicting success or failure of students in flight training. These improved procedures may prove to be highly beneficial to those officers who are charged with the responsibility of making correct recommendations concerning the retention or attrition of flight students. *

2. Cancellation. CNABATRA Instruction 1610.14 of 4 January 1963 is hereby canceled and superseded.

3. Discussion. Reference (a) established certain guide lines for use by administrators and student pilot disposition board members in determining whether particular students will be dropped from training or given another chance. The Psychology Laboratory of the Naval School of Aviation Medicine, using an electronic computer, subsequently developed techniques for giving predictions of what an individual student could be expected to do in the future. With the computer it was possible for the first time to take into account all the measures recorded during the student's training process and to combine them in the most properly weighted combinations that would yield the maximum reliability in predicting future behavior. More recent research, reported by reference (c), has made possible the following improvements: *

a. The original prediction formulae were based on the records of men who failed versus those of men who graduated. New formulae cover attrition for all causes, including DOR.

b. The probabilities of success or failure were originally reported only as "odds." The new procedures yield a "Predictor Score" expressed as a Navy Standard Score, with mean of 50 and standard deviation of 10. For each stage of training, the predictor score may be compared with the scores made by earlier students and interpreted as "percent graduating with such scores" or "approximate odds for and against graduation," or "approximate percentile rank." It is expected that this will make the predictions more immediately meaningful to administrators and to student pilot disposition boards.

4. Action. Commanding officers are requested to ensure that all officers* who deal directly with the administration of the flight training program and that all members of student pilot disposition boards under their commands become thoroughly familiar with the improved procedures delineated in enclosure (1). Reference (b) authorized the waiver of any provisions of reference (a) which may be in conflict with the procedures set forth in enclosure (1) hereto. It is further requested that those officers make judicious use of the predictions supplied by the Psychology Laboratory. The predictions are only probabilities of success or failure, and in no instance are they to be taken as the sole basis for a decision. Administrative officers and board members are not relieved of their individual responsibilities for weighing each individual student's case on its own merits. The predictions described herein are available on students in Pre-Flight Class 13-62 Cadet/AOC, Class 16-62 OI, and on all subsequent Pre-Flight classes. For students who are referred by a Student Pilot Disposition Board to CNABATRA, the appropriate NAVSCOLAVMED predictions will be entered in the "Reasons" section on the reverse side of ATJ Form 1-3, Summary--Student Pilot Disposition Board. For students who are returned to training by the Board without being referred to CNABATRA, no entry of the NAVSCOLAVMED predictions will be made in this section.


P. F. BEDELL

Distribution:
List 1, Case 1

PREDICTING STUDENT SUCCESS IN TRAINING

One of the most important tasks that faces administrators in the Naval Air Training Program is that of deciding whether a student who is in difficulty should be dropped or given another chance. Correct decisions in such cases lead to reductions in training costs and in the number of unsatisfactory men who reach the fleet. Incorrect decisions mean either that aircraft and instructors will be wasted on men who will fail later; or else the dropping of men who, if given another chance, would go on to become good aviators and good officers. Usually, in the past, the administrator(s) concerned have reviewed the student's grades, his selection test scores, his ratings, etc., and have based their decisions on some combination of what they felt to be the important aspects of his record. The development of electronic computers has made more accurate procedures available.

Computer analysis of the records of previous students shows that some grades are predictive of subsequent success or failure, while others are not. By computing methods it is possible to determine those weighted combinations of grades that predicted most accurately which former students would graduate and which would drop. The same formulae applied to the records of current marginal students yield "Predictor Scores" which can be compared with those made by past students.

The following graph-tables provide the predictor score records of past students for the various stages of training at which they can be computed. In order to obtain comparable information for current students follow the instructions at the top of the appropriate graph-table. For example, if you are considering the case of a student who is in difficulty during the 14th week of pre-flight the following steps will be taken:

Step 1. Is the student an officer or not? There are separate graph-tables for Ots and for NAC/AOCs. In this case the man is an AOC.

Step 2. Turn to the graph-table titled Cadets and AOCs - Pre-Flight weeks 14, 15 and 16.

Step 3. Look up the information required in the instructions at the top of the graph-table--and call it in to "Student Prediction" at Mainside 5137. In this case the student's name, pre-flight class number, point in training, peer rating, trampoline score, navigation and engines grades will be needed.

Step 4. Within about fifteen minutes they will call back and give you the student's predictor score for this point in training.

Step 5. Compare this score with the data for earlier students as given in the graph-table. Suppose for instance, that this student's Predictor Score is 36. In the SUMMARY Table you can see that such a score falls into the 35 - 41 bracket, and that seven per cent fell below this bracket. Since this man's score is toward the bottom of the bracket--one can safely say that this student compares to the bottom ten per cent of the students who entered in 1959 and 1960, and who reached the 14th week. For the whole 35 - 41 group the odds are about even, forty-eight per cent having graduated. This is, of course, a below average group, since, over all, sixty-four per cent of the students who reached this point went on to graduate. If you check this student's score of thirty-six against the curve that represents the percentage of graduates at each score level you find that about forty per cent of the men with such scores graduated, and that the odds are thus about three to two against the man. Said another way, of every five men who have had such scores in the past, three did not complete training.

NOTE:

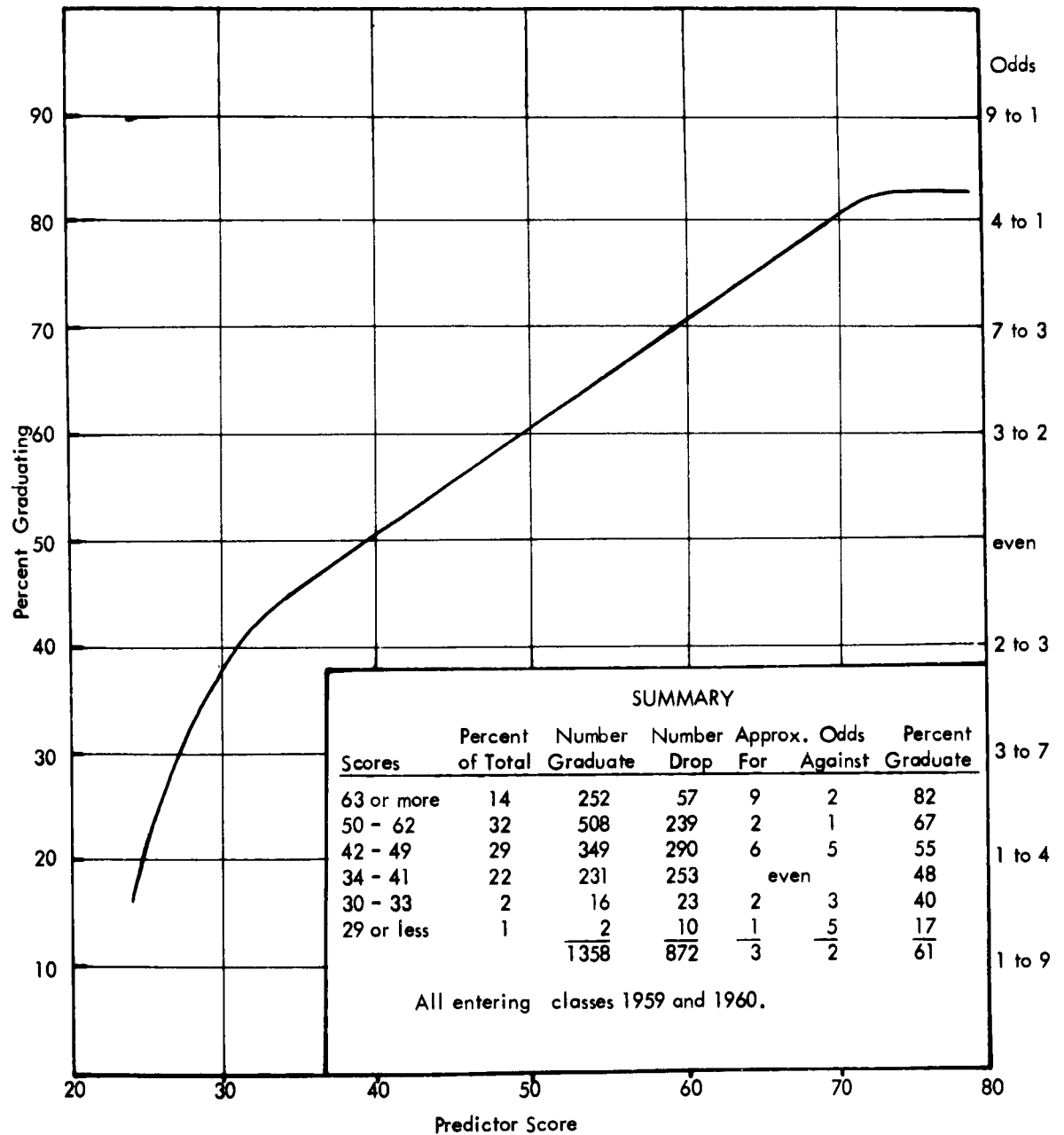
These instructions and tables were prepared by the Aviation Psychology Branch, Psychological Sciences Division, Research Department, U.S. Naval School of Aviation Medicine, U.S. Naval Aviation Medical Center, Pensacola, Florida.

Questions or suggestions regarding these materials should be addressed to the Aviation Psychology Branch, Mainside, Bldg. 16, Telephone ext. 3146.

CADETS AND AOCs - PRE-FLIGHT, WEEK 1

Call Mainside 5137 and ask for "Student Prediction." Give the student's name, pre-flight class number, and his present point in training.

Give your name and telephone number.

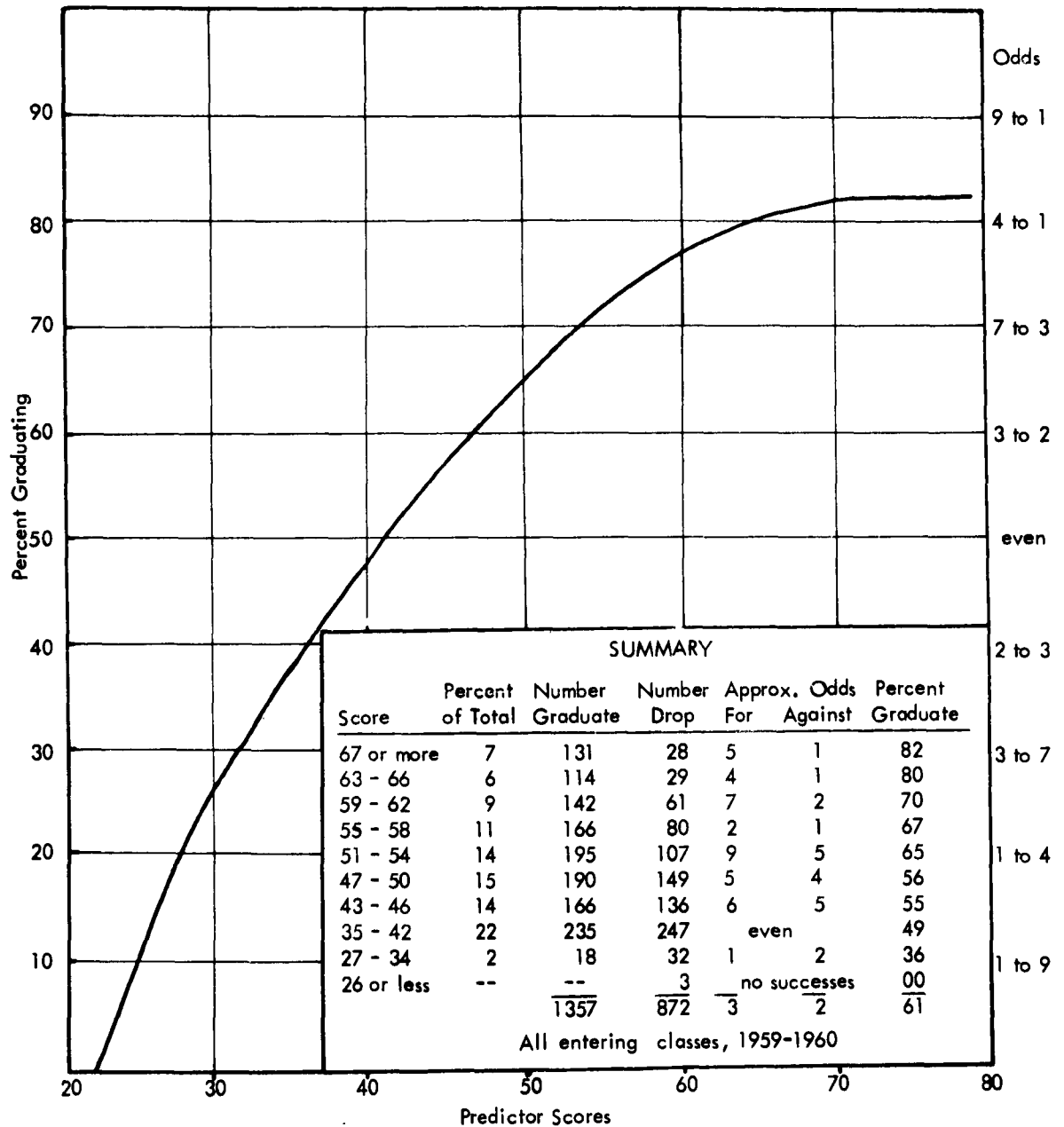


Enclosure (1)

CADETS AND AOCs - PRE-FLIGHT, WEEK 2

Call Mainside 5137 and ask for "Student Prediction." Give the student's name, pre-flight class number, and his present point in training.

Give your name and phone number.

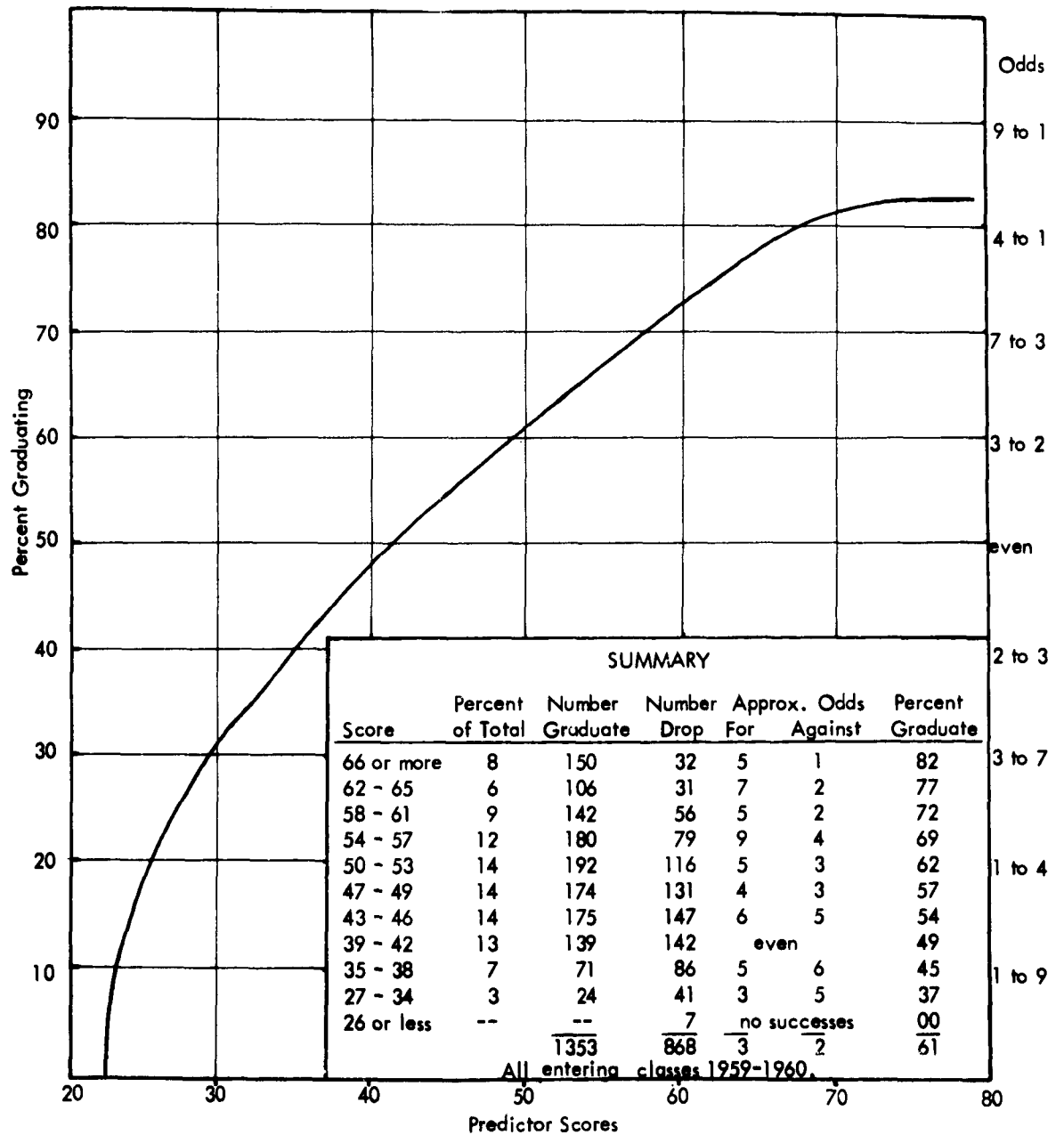


Enclosure (1)

CADETS AND AOCs - PRE-FLIGHT, WEEKS 3, 4, and 5

Call Mainside 5137 and ask for "Student Prediction." Give the student's name, pre-flight class number, and his present point in training. Give his score on the jump reach test.

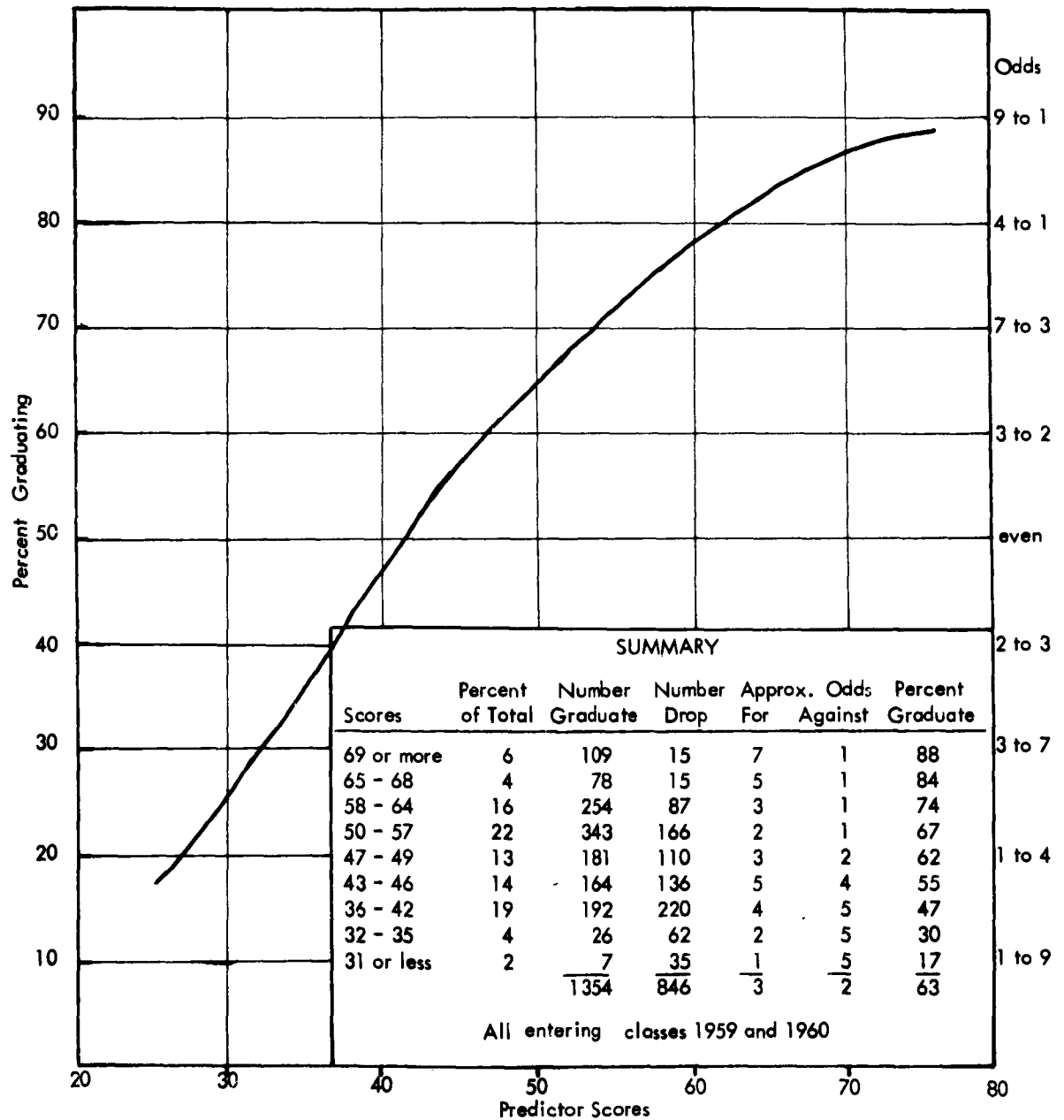
Give your name and phone number.



CADETS AND AOCs - PRE-FLIGHT WEEKS 6, 7, and 8

Call Mainside 5137 and ask for "Student Prediction." Give the student's name, pre-flight class number, and his present point in training. Give the following grades or scores; math final grade, jump reach score.

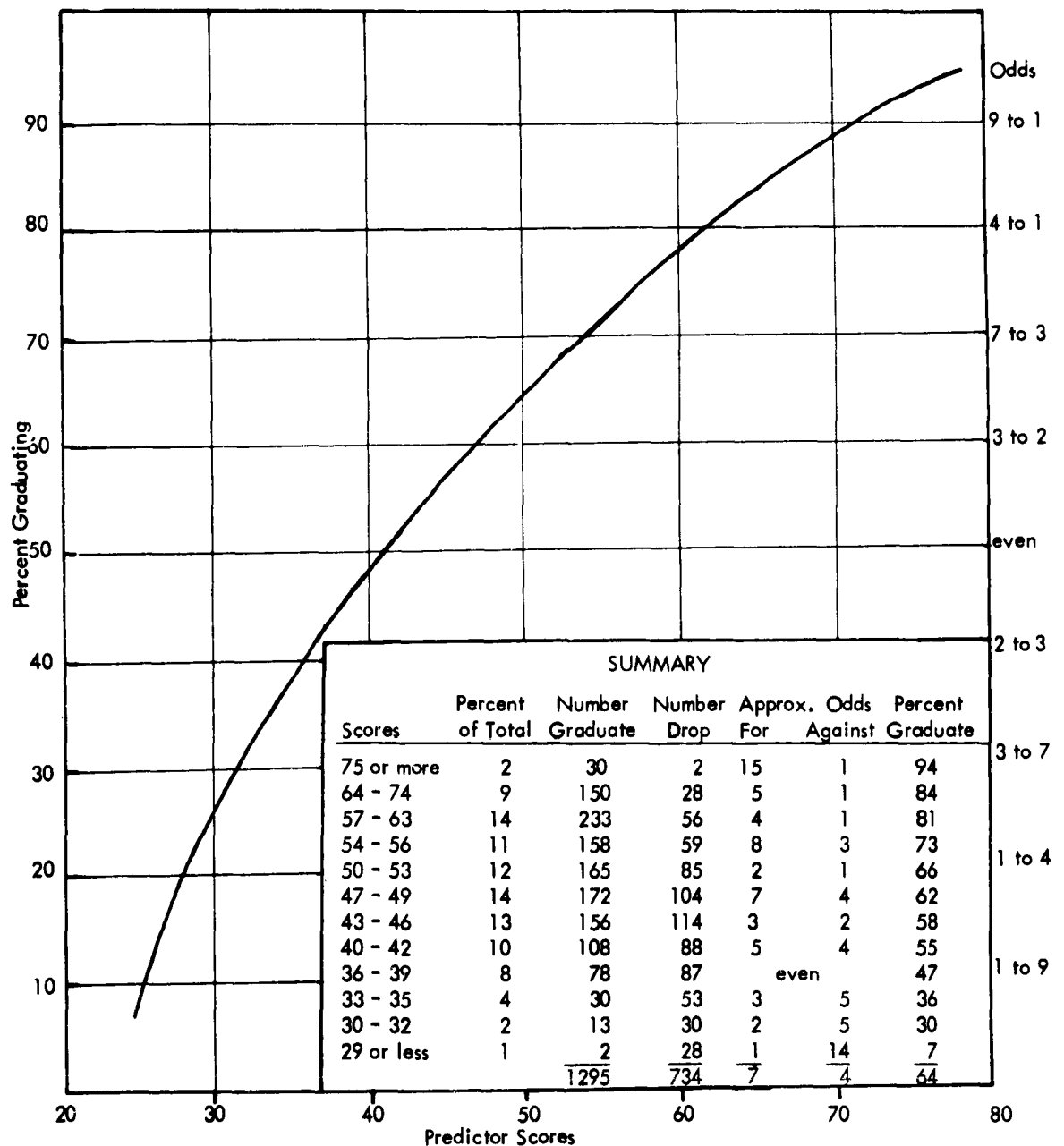
Give your name and phone number.



CADETS AND AOCs - PRE-FLIGHT WEEKS 9 and 10

Call Mainside 5137 and ask for "Student Prediction." Give the student's name, pre-flight class number, and his present point in training. Give his peer rating, his trampoline grade and his physics grade.

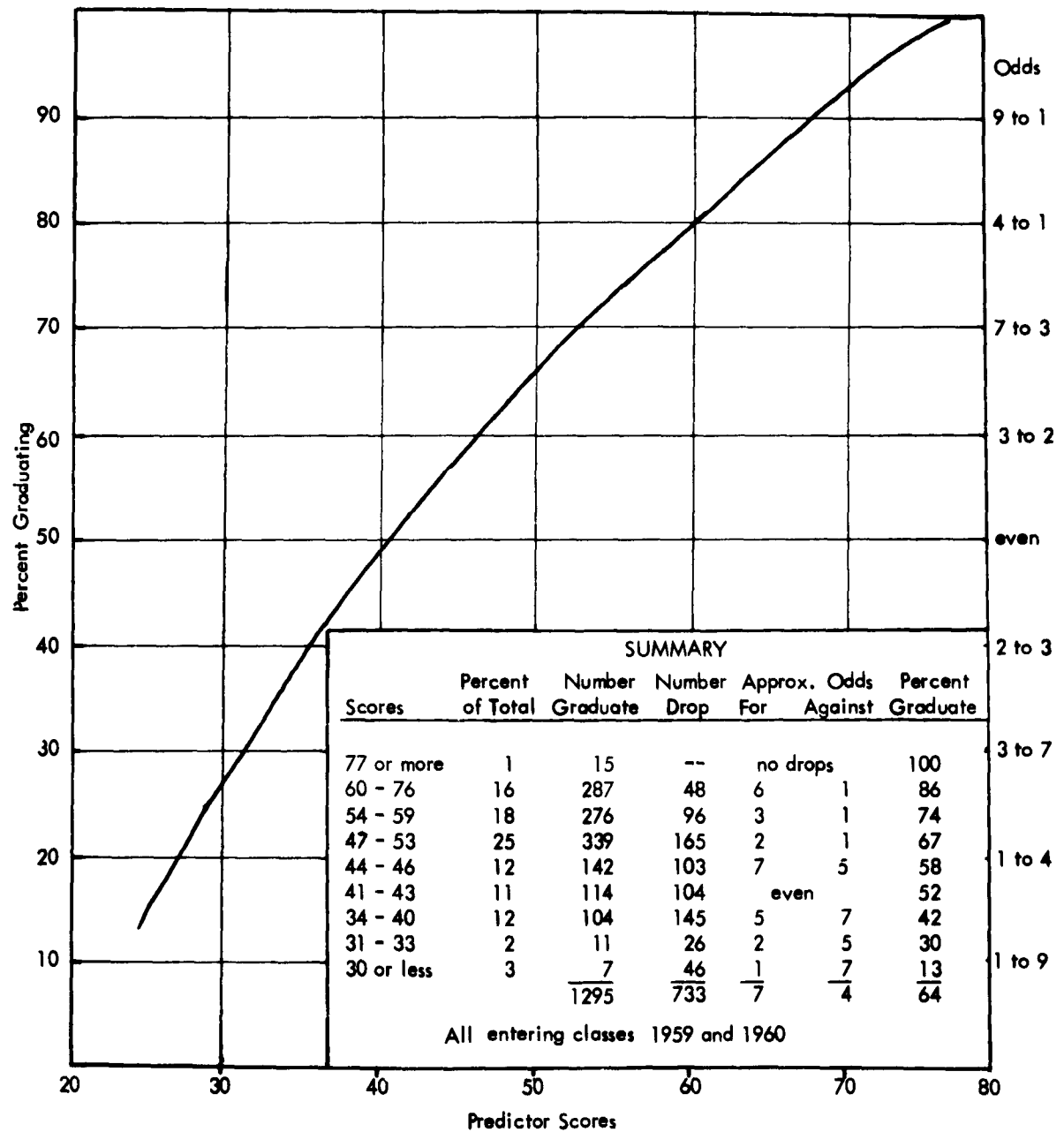
Give your name and phone number.



CADETS AND AOCs - PRE-FLIGHT WEEKS 11, 12 and 13

Call Mainside 5137 and ask for "Student Prediction." Give the student's name, pre-flight class number and his present point in training. Give his peer rating, his navigation grade, and his trampoline score.

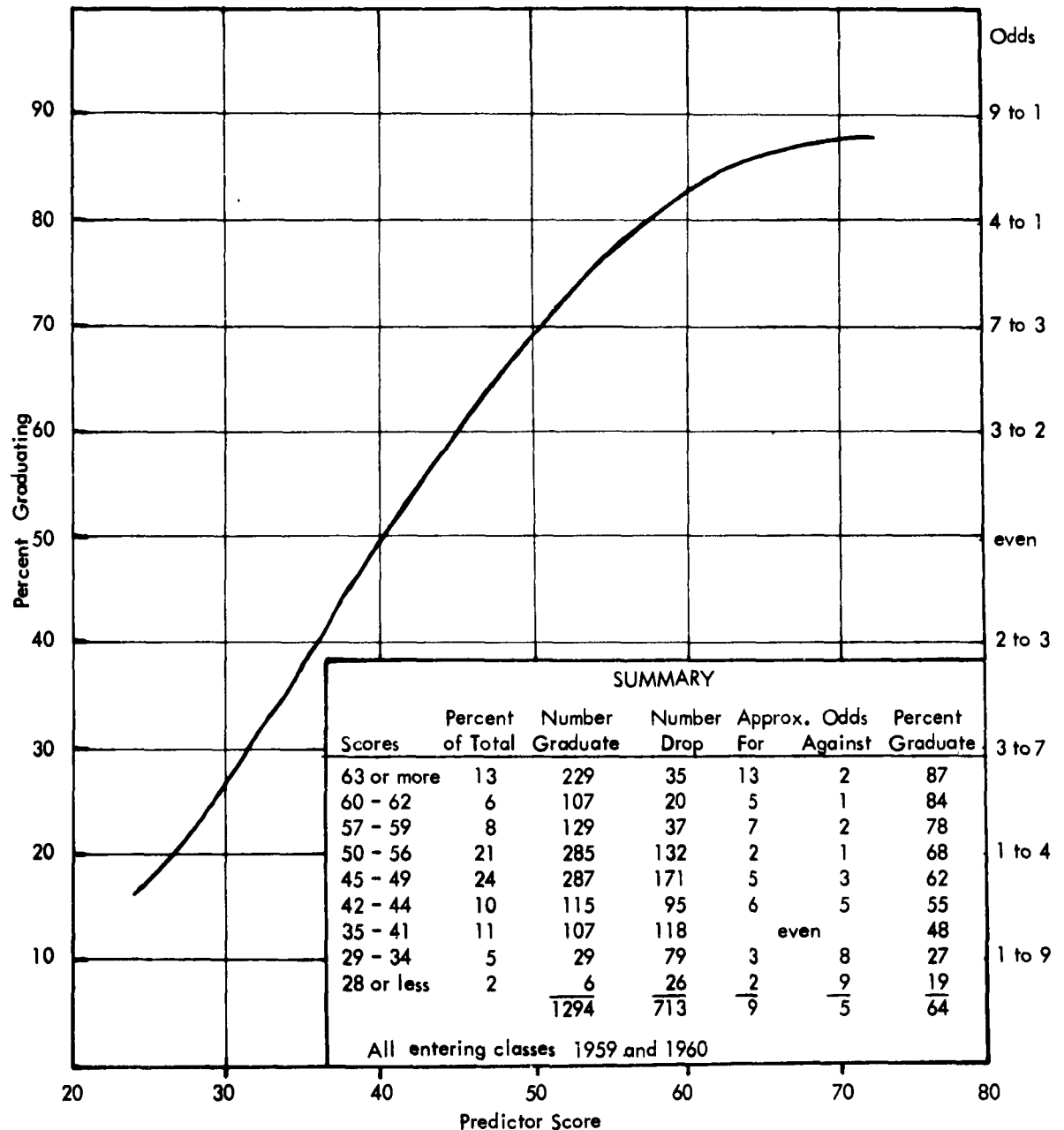
Give your name and phone number.



CADETS AND AOCs - PRE-FLIGHT WEEKS 14, 15 and 16

Call Mainside 5137 and ask for "Student Prediction." Give the student's name, pre-flight class number, and his present point in training. Give his peer rating, his trampoline score, and his navigation and engines grades.

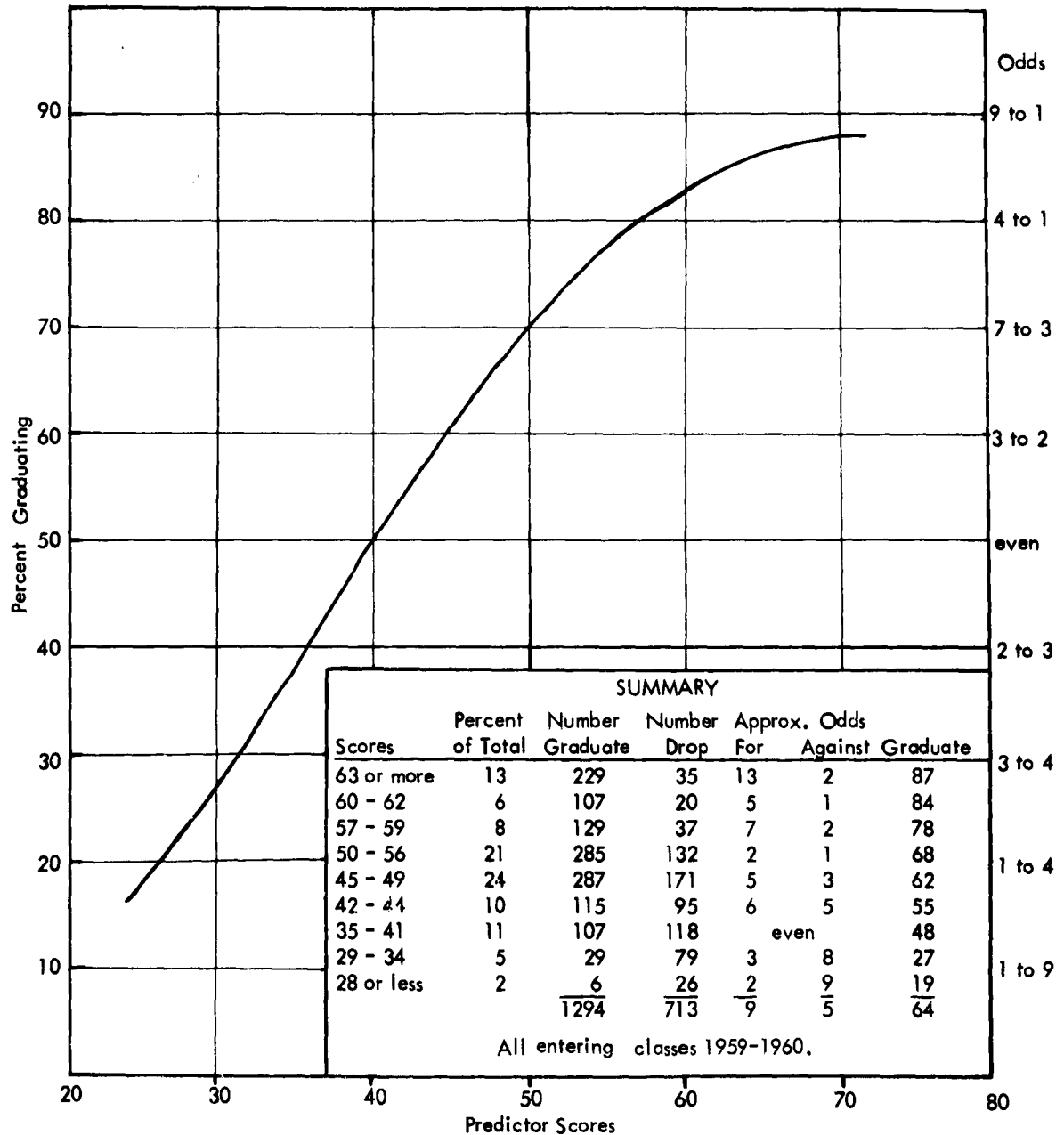
Give your name and phone number.



CADETS AND AOCs - PRE-SOLO PRIOR TO HOP #9

Call Mainside 5137 and ask for "Student Prediction." Give the student's name, pre-flight class number, and his present point in training.

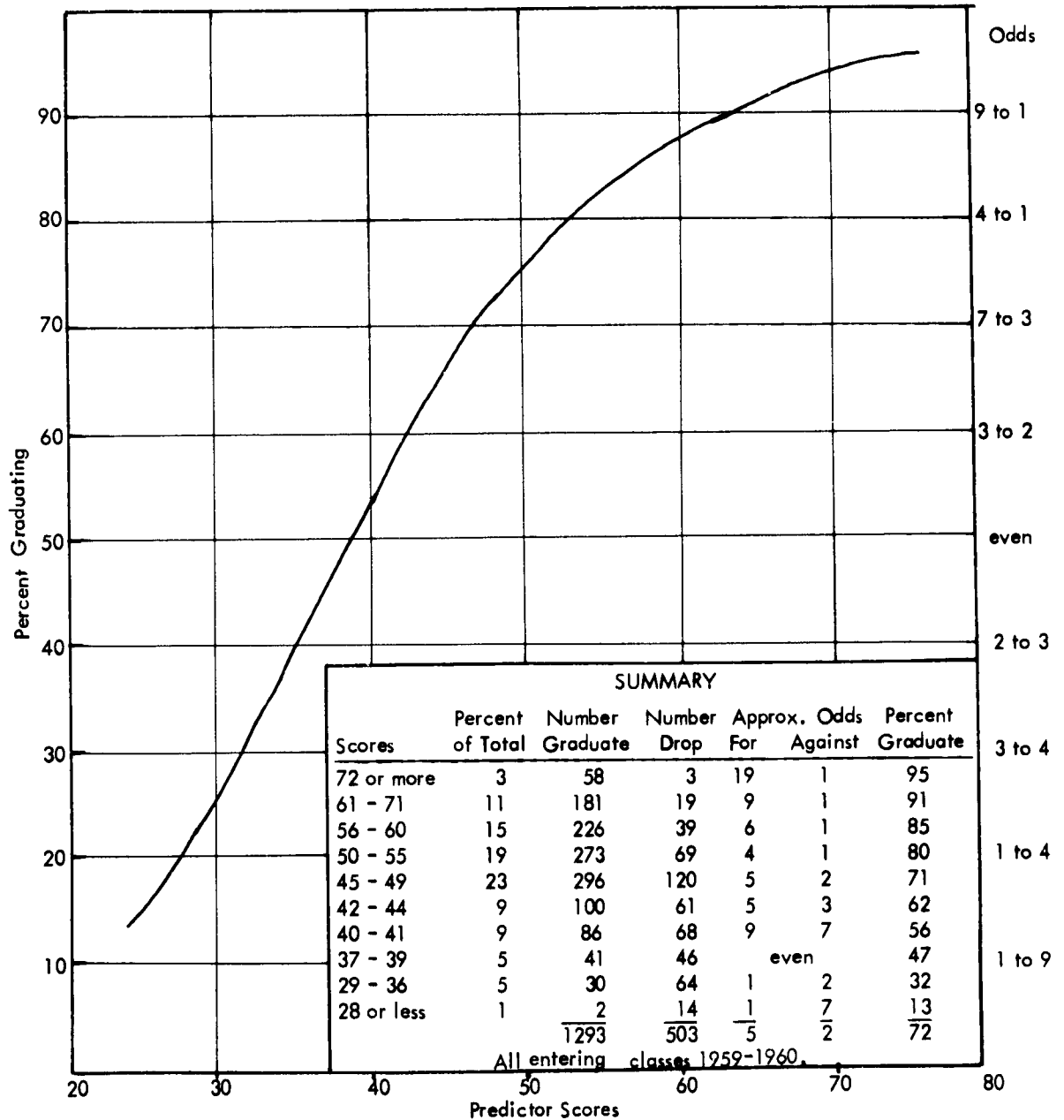
Give your name and phone number.



CADETS AND AOCs - PRE-SOLO, HOP #9 and AFTER -- PRECISION (VT-1)

Call Mainside 5137 and ask for "Student Prediction." Give the student's name, pre-flight class number and his present point in training. Give his pre-solo flight grade to date.

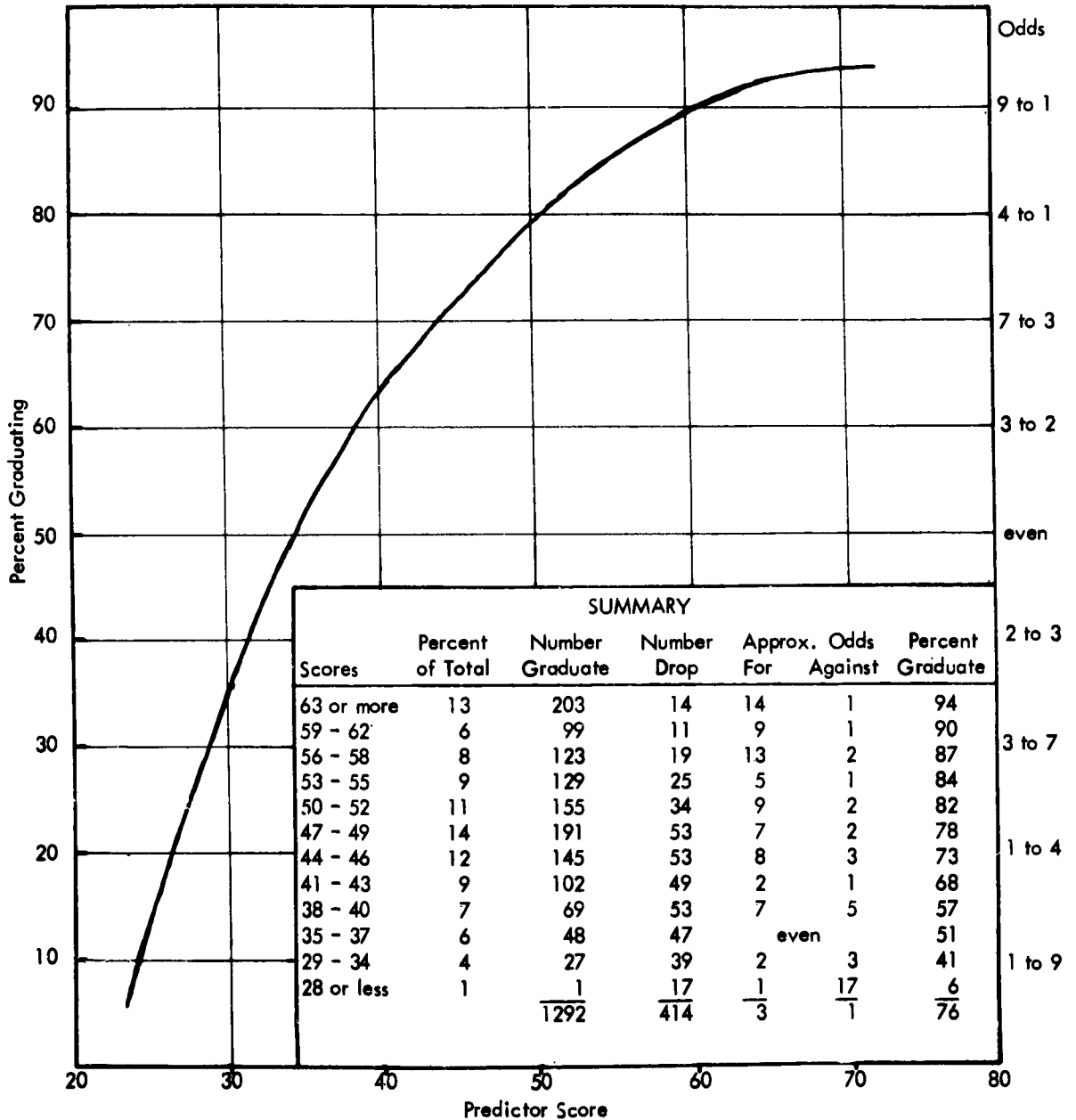
Give your name and phone number.



CADETS AND AOCs - TRANSITION (VT-2)

Call Mainside 5137 and ask for "Student Prediction." Give the student's name, pre-flight class number, and his present point in training. Give his pre-solo and his primary precision grades.

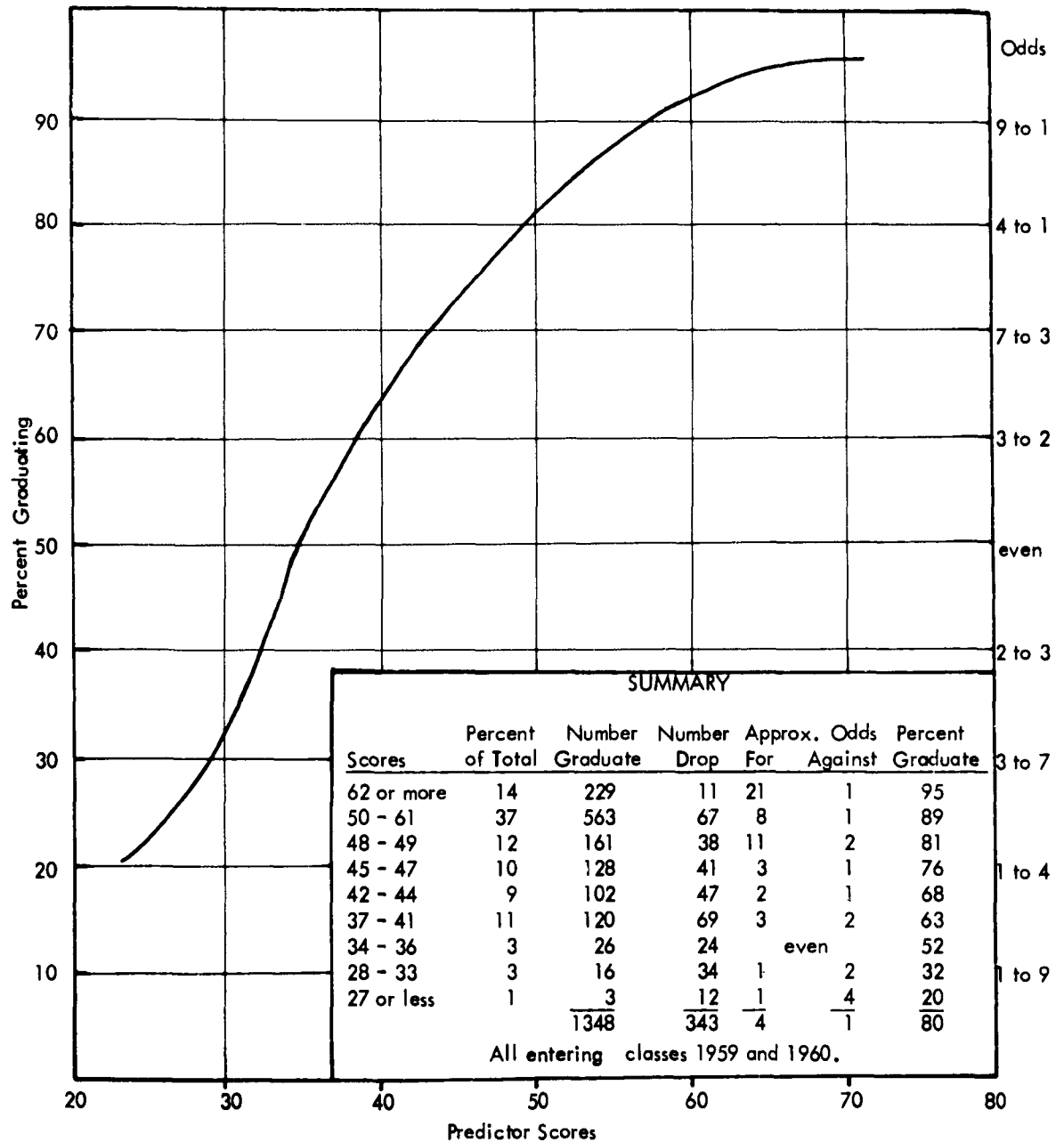
Give your name and phone number.



CADETS AND AOCs - PCSN - ACROBATICS AND AFTER

Call Mainside 5137 and ask for "Student Prediction." Give the student's name, pre-flight class number and his present point in training. Give his pre-solo and his transition flight grades.

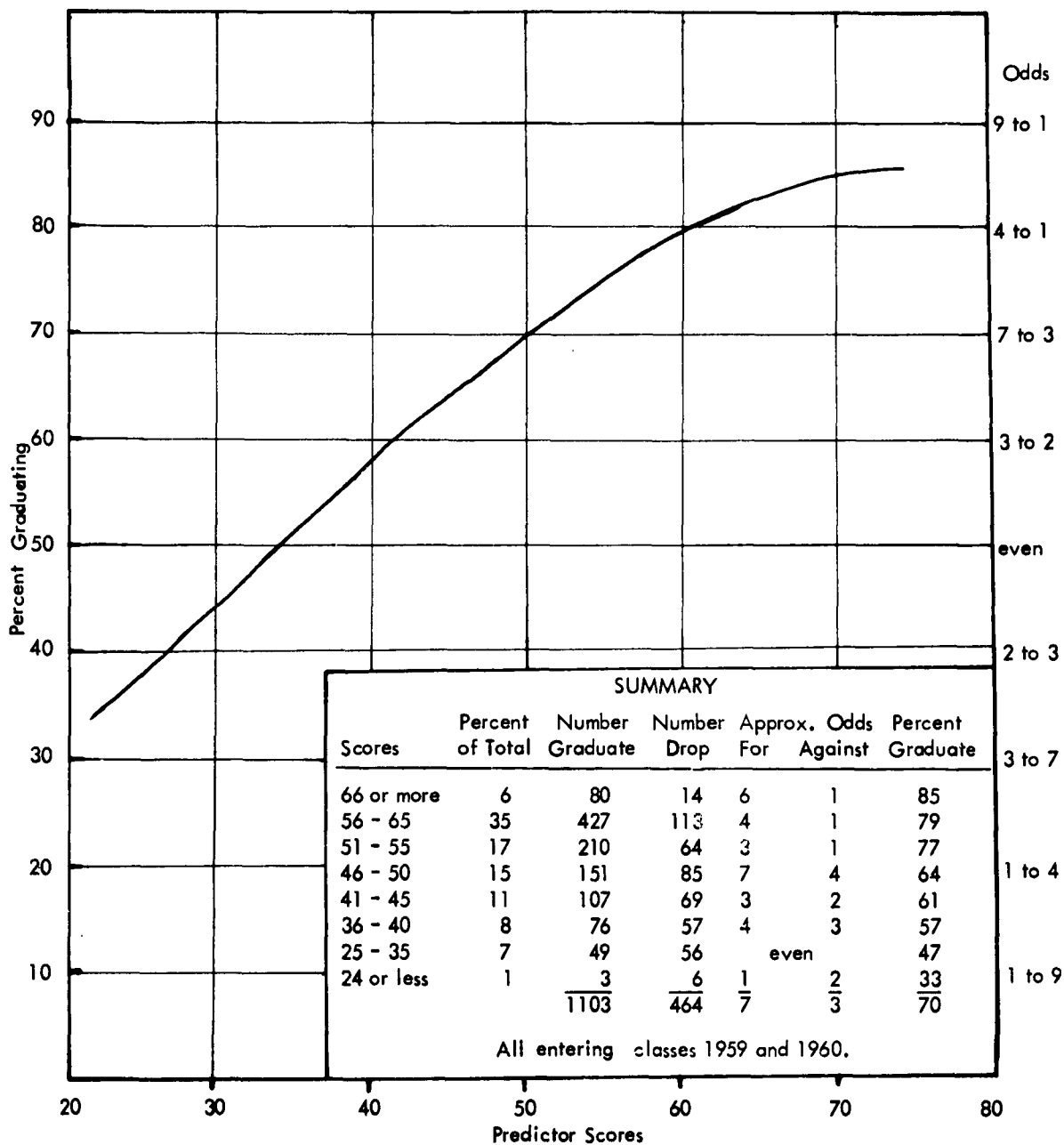
Give your name and phone number.



OFFICERS - PRE-FLIGHT WEEKS 1 and 2

Call Mainside 5137 and ask for "Student Prediction." Give the student's name, pre-flight class number and his present point in training. Give his score on the incoming math test.

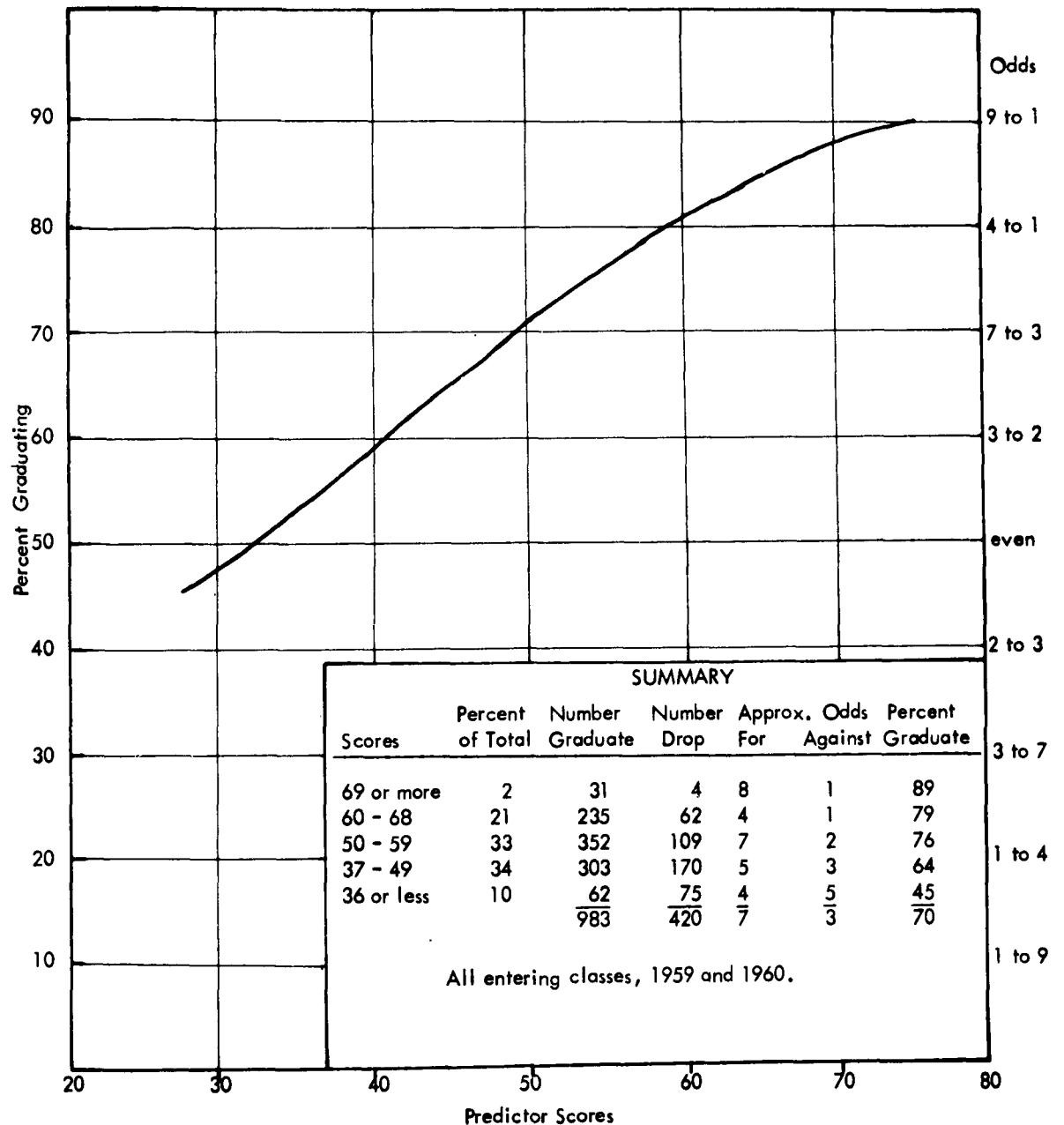
Give your name and phone number.



OFFICERS - PRE-FLIGHT WEEKS 3, 4, and 5

Call Mainside 5137 and ask for "Student Prediction." Give the student's name, pre-flight class number, and his present point in training. Give his score on the incoming math test and his grade in physiology.

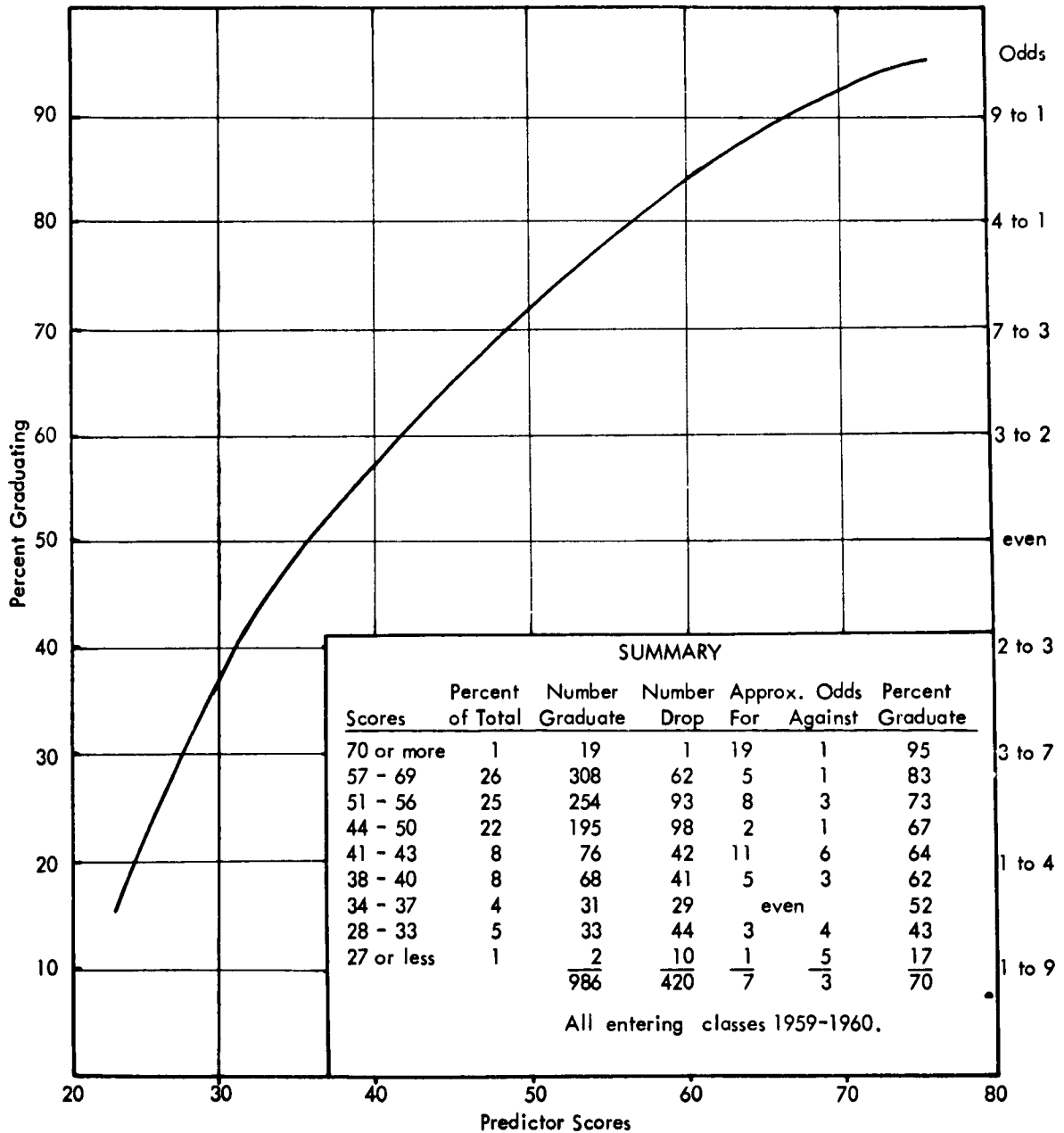
Give your name and phone number.



OFFICER - PRE-FLIGHT WEEK 6

Call Mainside 5137 and ask for "Student Prediction." Give the student's name, pre-flight class number, and his present point in training. Give his score on the incoming math test, his aerodynamics grade and his engines grade.

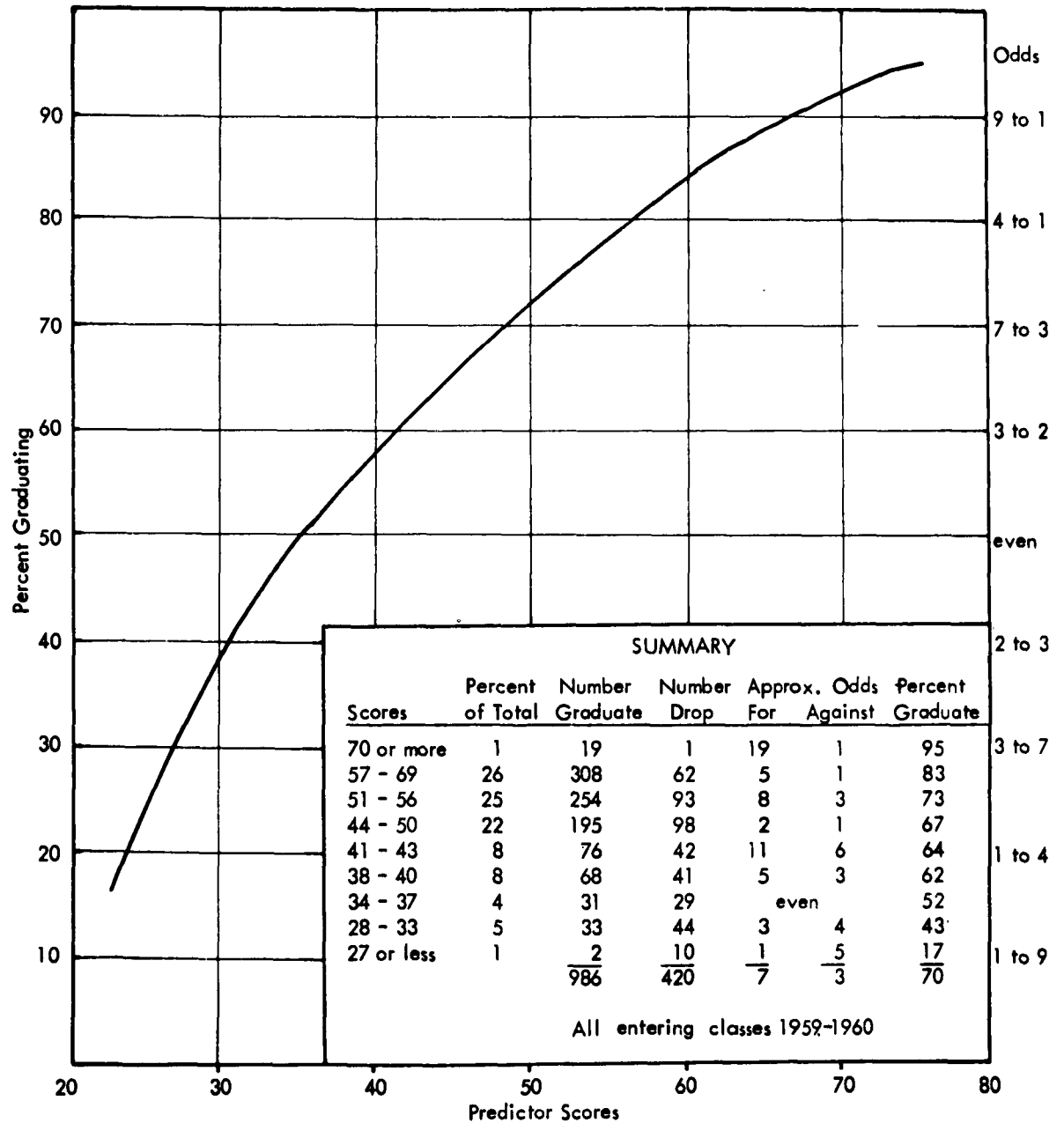
Give your name and phone number.



OFFICERS - PRE-SOLO PRIOR TO HOP #9

Call Mainside 5137 and ask for "Student Prediction." Give the student's name, pre-flight class number, and his present point in training.

Give your name and phone number.

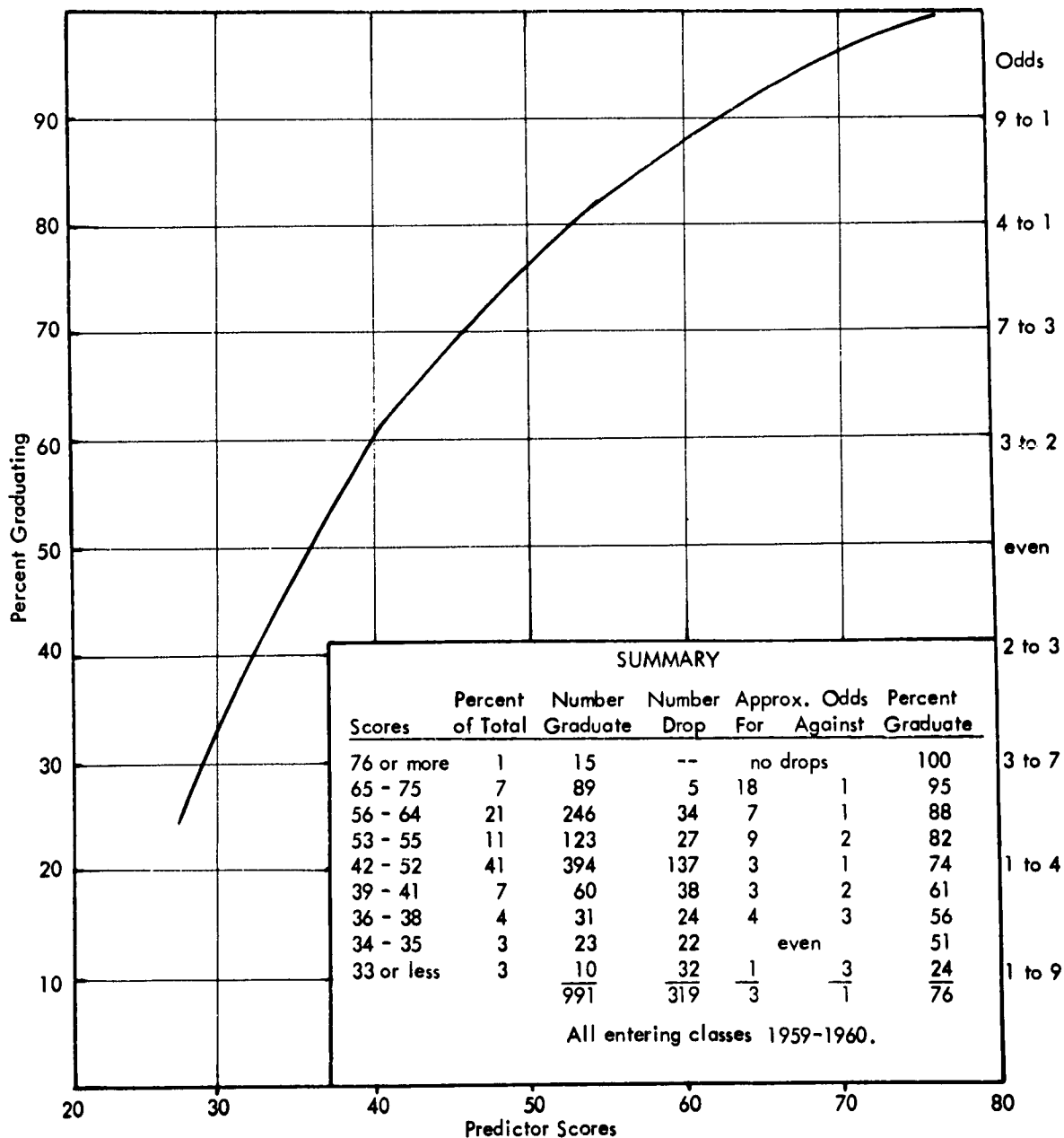


CNABATRAINST 1610.14A

OFFICERS - PRE-SOLO, AFTER HOP #9, and PRECISION (VT-1)

Call Mainside 5137 and ask for "Student Prediction." Give the student's name, pre-flight class number and his present point in training. Give his pre-solo flight grade to date.

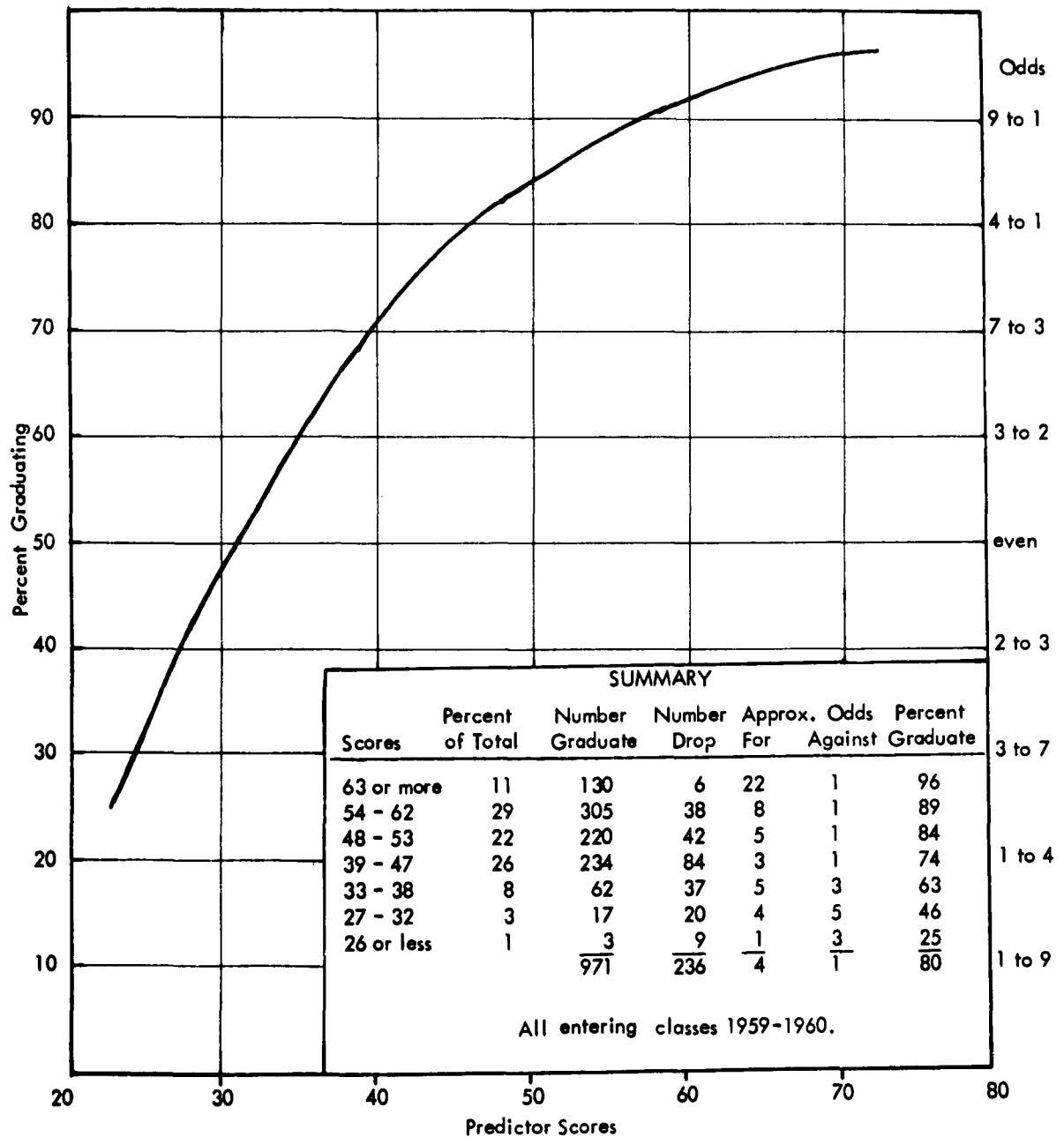
Give your name and phone number.



OFFICERS - TRANSITION (VT-2)

Call Mainside 5137 and ask for "Student Prediction." Give the student's name, pre-flight class number and his present point in training. Give his precision (VT-1) flight grade.

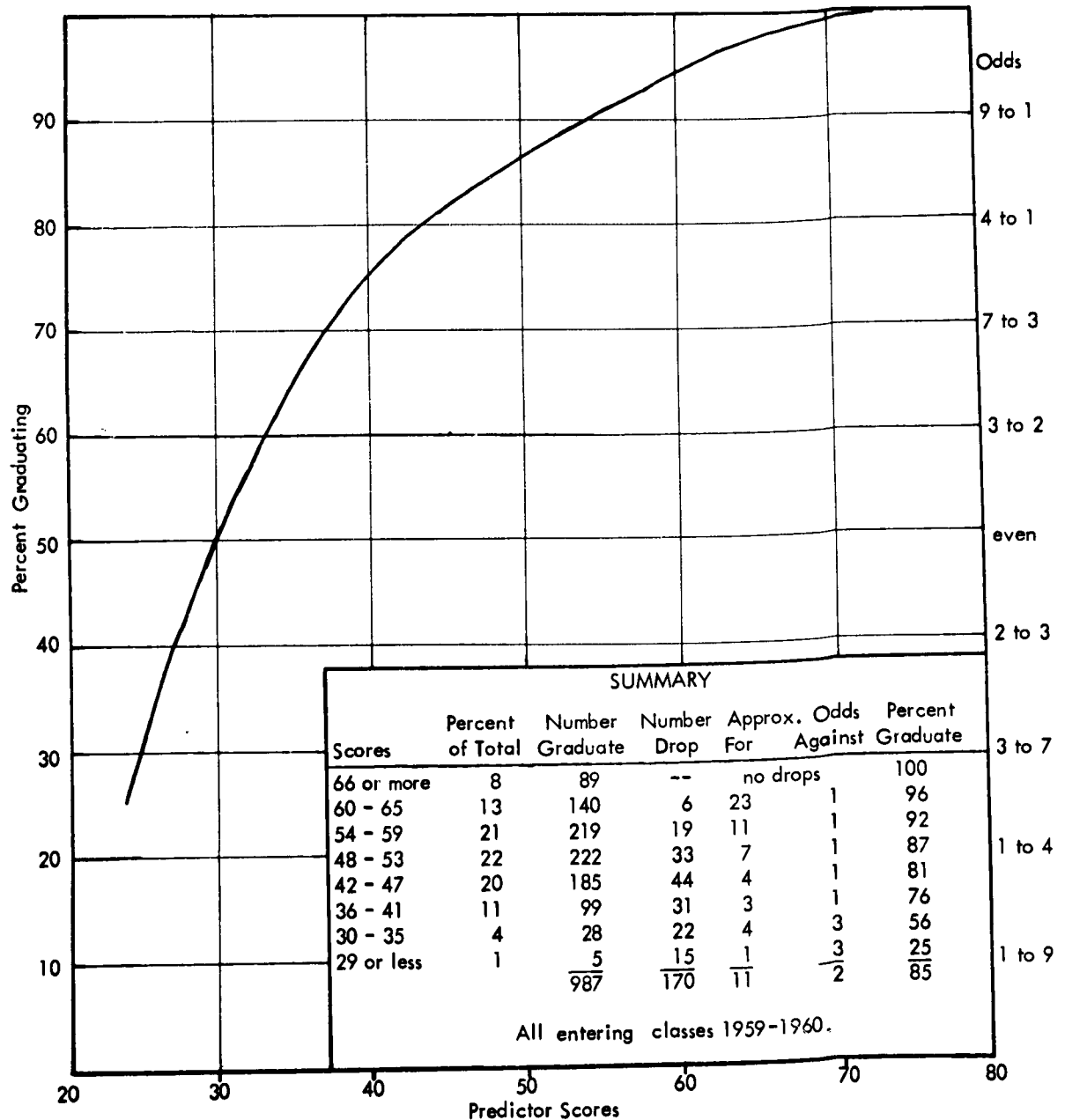
Give your name and phone number.



OFFICERS - PCSN — ACROBATICS

Call Mainside 5137 and ask for "Student Prediction." Give the student's name, pre-flight class number and his present point in training. Give his precision (VT-1) and his transition flight grades.

Give your name and phone number.



OFFICERS - BEYOND PCSN - ACROBATICS

Call Mainside 5137 and ask for "Student Prediction." Give the student's name, pre-flight class number and his present point in training. Give his precision (VT-1) and his transition flight grades.

Give your name and phone number.

